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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 matters, are active media of new combinations and changes; they undergo alterations, and are even destroyed by the exercise of their own powers, the entire cellation 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 she allows to man, to the plant or the insect, is not the least necessary and certain. But, if individuals are sacrificed and perished, the species survives 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 alternation of deaths and births, of losses and reparations; and the torch of life is rapidly transmitted in the series of succeeding generations; "quasi currentes vitæ lampadæ 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 re-production is effected by a true process 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.

"Àenedum genetrix, hominum divumque voluptas,
Alma Venus! calis subter labentia signa
Quae mare navigerum, quae terras frugiferentis
Conceleras; per Te quoniam genus omne animantium
Concipitur, vixitque eortum lumina folis:
Te, Deus, te fugiunt venti, te nubila coeli,
Adventumque tuum: tibi funaves dedita tellus
Submittit flores; tibi rident azegra ponti,
Placatamque nitet diffuso lumine coelum.
Nam, timul ac species patetaceta est vera diei,
Et referata viget genitabiles aura Favoni;
Aeris primum volatres, te, Diva, tumque
Significant imitum, perculsa corda tua vi.
Inde fere pecudes perfaltant pabula leta,
Et rapidos tranant annes; ita, capta lepore,
Illecebrisque tuis omnis natura animantium
Te fequitur cupide, quo quamque incidere pergir.
Denique, per maria, ac montes, fluvioluque rapaces,
Frondiferatque domos avium, campofque virentes,
Omnibus incitans blandum per pectora amovens,
Efficiat ut cupide generatione focla 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 agglutinated by their faces,
faces, which determine the order of arrangement; while living bodies are composed of numerous fibres or plates, heterogeneous in their composition, diversified in their configurations, and defined to particular situations, so that they can only be in one place, and between other determined fibres or lamelle. Moreover, living bodies, however small they may be, possess all their parts from the first moment of their existence; they grow, not by the addition of new layers, but by the sometimes uniform, and sometimes irregular development of parts, all of which existed previously to any sensible growth. The only circumstance belonging to all kinds of generation, and consequently the only essential circumstance in the process is, that every living body, at the first periods of its sensible existence, is attached to a larger body, of the same species with itself, that it makes a part of this larger body, and is nourished by its juices for a certain length of time. Its subsequent separation confutes its birth; which may be produced simply from the life of the larger body, and the consequent development of the smaller, without the aid of any occasional cause. Thus, in its essence, generation, as far as we can understand it, is only the appearance of a small organized body upon or in some part of another and larger one, from which it will be separated, at the expiration of a certain period, in order to assume an independent and isolated existence. All the acts or organs, which co-operate in the process, in a certain clade of organized bodies, are only accessory to this primary function. When the function is thus reduced to its most simple state, it constitutes the genniparous, or generation by shoots. In this way buds are formed on trees, and developed into branches, which will form future trees, by means of slips or cuttings. The polypyle (hydra) and the sea anemone (actinia) multiply in this manner; some worms are propagated by a division of their body, and must therefore be arranged in the same division. This mode of generation requires no distillation of sex, no copulation, nor any particular organ. Other modes of generation are accomplished in appropriate organs: the germ appears in a definite fraction of the body, and the affluence of certain operations is required for their further development. These operations constitute fecundation, and suppofe the existence of sexual parts; which may either be separate or united in the same individual. The fecundated or fecundable sex, in which the germ is found, is the female; and the fecundating sex, the affluence of which is necessary for the complete development of the germ, is the male. The office of the latter is that of furnishing the fecundating or seminal fluid; but the manner in which that contributes to the development of the germ, is not yet settled by physiologists. Some, forming their opinions from the human subject and the mammals, where the germ is imperceptible before fecundation, suppose that these are created by the mixture of the male fluid, with that which they suppose to exist in the female; or that they pre-exist in the male semen, and that the female only furnishes them with an abode. Others confit that the alogy of the other clades of animals, and of plants. In several instances, particularly in the frog, the germ may be clearly recognized in the ovum of the female before fecundation; its pre-existence may be inferred, in other cases, from the manner in which it is organically connected to the ovum, when it is first visible. For it is agreed on all sides, that the ovum exists in the female before fecundation, since virgin hens lay eggs, &c. From this analogy, these physiologists conclude, that the germ pre-exists in all females, and that the fecundating liquor is a stimulus which begins on it an independent life, by awakening it, in a manner, from the species of lethargy, by which it would have otherwise constantly remained.

The origin of the germs, and the mode of their existence in the female; whether they are originally formed in all their parts in each individual by any vital proceeds, or are all pre-existent, being included in each other, or whether they are differentiated through the body, and require a concomitance 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. These points have for a long time been agitated by physiologists; but the discussion seems now to be abandoned by universal consent.

The combination of the sexes, and the mode of fecundation, are subject to great variety. In some instances, the two sexes are united in the same individual, and fecundation is accomplished without any extraneous aid; such are the hermaphrodite and monocious plants, the acophilous mollusca, and the echinoderms. In others, such individual po bifolies both sexes, but requires the assistance of another, which it fecundates, and by which it is fecundated. This is the case with the gasteropodous mollusca, and with several worms. There are distinct individuals, male and female, in other classes; as, for instance, in the dicocious plants, in all animals, which have a vertebral column, in the cephalopodous and some gasteropodous mollusca, in some worms; in the crustacea, and in insects; in short, in the far largest portion of the animal kingdom.

Fecundation is accomplished in plants by means of a liquor contained in small capsules, which resemble a fine powder in appearance, lodge on the female organs, and, burrowing, deposit their contents. In animals, the liquor is always applied immediately upon or about the germ; and in many cases it is not brought in contact with the ova, until they have been laid, as in the bony and ovinous 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 ova and semen, but fecundation is still performed out of the body. Lastly, in the great majority of insects, the seminal liquor, introduced by the male into the body of the female, fecundates the ova before they are laid. This is the case in the mammals, birds, most reptiles, and some fishes, in the hermaphrodite gasteropodous 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 ova may be discharged without previous copulation, as in the preceding ones. But they receive no further development; nor can they be fecundated when thus voided. The effect of a single copulation varies in its degree; it usually fecundates one generation only, and produces one pregnancy; but sometimes, as in poultry, several eggs are fecundated, and afterwards discharged successively: still, however, they only form one generation. In a very few instances, one act of copulation fecundates 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 molluscs, through twelve or fifteen.

When the germ is detached from the ovary, 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 ferves 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 mass of nourishment, and the surrounding membranes, constitutes an egg, or ovum, and the animals, which produce their
young in this state, are denominated oviparous. 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 operation 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 truly oviparous animals.

The ovum, after being fecundated, and detached from the ovariun, remains in some animals within the body of the mother, until the contained germ be developed and hatched. These are false oviparous animals, or ovo-oviparous. The viper and some fishes afford instances of this process.

The mammalia alone are truly viviparous animals. Their germ poises only 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 ramification 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 possess an ovum, in the sense which 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. Feculation, which belongs only to those instances 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-sewation, 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 gemmiparous generation, may be accomplished at any point of the body, and has, therefore, no peculiar organ. 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 gellation requires a receptacle adapted to the abode of the foetus. Thus we have preparatory and precluding organs; intruments 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 precluding 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, 11. Of the tefficles, which prepare the seminal fluid, and conduct it, either into a particular receptacle, or into a canal, from which it is conveyed out of the body, or into a cloaca, from which it is in like manner ejected: 2dly. Of the vehicle feminale, supposed to be referveirs for the former: 3dly. Of the prostat glands; and, 4thly. Of Couner's glands, which separate a peculiar fluid, mixed with the semen at the time of coition. The testicles are absent in the last classes only of the animal kingdom, where generation is performed by a simple division of the animal, or by shoots. They exist in all the classes of vertebral animals; and, of the invertebral division, in the mollusca, crustacea, insects, and most worms. Their number, structure, &c. differ very much in these various classes. The vehicle, prostates, and Cowper'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 male organs serve the purpose of developing and preparing the germs. Their existence is as general as that of the parts just mentioned; but they are much more simple in the first classes of the animal kingdom. They consist of two bodies similar in form, size, and structure, and named by modern physiologists ovaria, in order to express more accurately, than by their old name of testicles, 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, its 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 preclusion of the germs or ova, 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 penis, generally perforated by a canal, named the urethra, capable of being introduced into the female organs, in order to convey to the latter the fecundating liquor, or for the simple purpose of producing an irrigation 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 destined 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 ovariun, retain it for a greater or less length of time, contribute in a more or less direct manner to its growth, and convey it out of the body: or they furnish nourishment to the young, when born, or afford it 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 parietes 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 Fallopian tubes in the mammalia, oviculus 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 possesses 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 necessary, 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
organized beings; this seems to have been a very leading object, and one accordingly, in which she has developed all the fertility of her resources. Scarcely can such diversified phenomena be reduced, by artificial classifications, to any common and constant laws: new facts freshly 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 should be particularly attended to by those who are employed in delineating the manners of animals. They will probably find that the propensities and habits of each are intimately connected with the mode of propagation; and that the character of its wants, pleasures, and labours, its soccibility 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 man, 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, posing most circumstances in common, is distinguished by certain particular traits. He quits the womb of his mother with organs capable of refilling the impositions of the atmosphere, and of assimilating food to his own substance: he can therefore live by his own independent powers. He is not destined to remain, like the oviparous animal, included in a foreign envelope, and to continue for an indeterminate length of time in a state of inaction which hardly differs from non-existence: he does not visit until creative warmth begets 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 invisible point. The human fetus has been supported in the uterus by fluids animalized in the vessels of the mother: it submits, immediately after birth, on milk, prepared in organs set 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 manifested by sensible 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 appetites which solicit their action 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 impositions made on one by the charms which nature has bestowed on the other, belong to the fames; 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 factitious wants. On the other hand, the secretion of the fluid, by the emission of which man contributes to the reproductive process, the mysterious work of conception, the development of the new being, &c. all belong to the organic life.

Sexual Difficulties.—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 situation. 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. Buffon turns the ovaries into follicles, and endeavours to prove that the addition of the uterus alone constitutes any essential distinction between the male and female sexes.

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 supposed analogies, and prove that man and woman do not differ in the relations of more or less, but that the structure and functions of their generative organs are different in their kind; that their whole constitution has in each its peculiar type, the distinctive traits of which offer to our view 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 points, where the sexual physiology is the most decidedly explicated, if the superficial traits, and the sweetly rounded contours, which constitute her charms, form her most agreeable distinguishment, 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 fysicks, 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 epocha of puberty, at that period of life called by Buffon "le prin temps de la nature, la saison des plaisirs," that the assemblage of all the sexual traits is exhibited to our observation; and that man and woman, attracted to each other the more forcibly in proportion as they differ, become connected by various relations, which enlarge an existence 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 object
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-fifth. The middle of the body in man is at the separation of the lower limbs at the pubes: in woman it is higher, and hence the lower limbs are shorter, while the lumbar 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 circumference is seen in the Venus, and the whole formation of these parts is attended with advantages in gestation and parturition, although the peculiarity in question is not seen in those females which in common opinion are the best formed. The convexities described by the lower limbs at their upper part, and uniting them by such happily rounded forms 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 hemispherical form. All other parts of the lower limbs are distinguished by their softly rounded outlines. The foot is smaller, and the base of support for the body is proportionally 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 chisel 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 constitute, in their comparatively greater size, a very impressionable feature of the superior strength, which is the attribute of the male sex. In the female trunk, on the contrary, the broadest 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 capacious than in the male. Hence the superior breadth of the female hips; hence the opposite characters of the trunk in the two sexes, in respect to size. The trunk of the female is a pyramid, with the broadest 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. (Mémoire sur l'homme Physique.)

In these 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 outliners being fo much broader in the male, and the hips in the female. The greater breadth of the pelvis gives a broader base

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bac 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 progression the centre of gravity is more sensibly changed at each step; and there is a perceptible rolling of the pelvis, which characterizes the female gait. The inconvenience of this arrangement counterbalances 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 disposition 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 retracted 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 fix the well-formed female skeleton; where the structure can exhibit or recall the leading traits of the female form. After much trouble and observation, Soemmerring met with a specimen of what he considered the best and most natural form in a young girl of Mentz, 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 foetuli feminini, jicopt 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 turned, and is distinguished by its smoothness. They are often actually flatter, and have on the whole a peculiarly feminine character, which cannot be easily conveyed in description. 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 projects the further in the erect or supine position of the male, the symphysis pubis does the same in the female. The loins are longer, and the angle between them and the sacrum 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 sacrum is turned more backwards, is broader, and more concave; the ossa coecyges, more movable and flender, project less into the cavity of the pelvis. The hip-bones (osse inominata) are broader, smoother, and expanded further in the lateral direction; therefore their crista and tuberocities are more distant, hence the space between the osse pubis is greater. The angle formed between the ramus and symphysis pubis is larger: that 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 osse pubis: "Ad virum amittendum iterum pedes et musculorum inferiorum observavit Albinus de Ferreto, p. 475." The tuberocities of the ischia are more distant, larger and smoother. The clavicles are less curved, and the shoulder joints are less distant. The acetabula are further apart, and the thigh-bones more oblique in their position: the latter are also more curved forwards, and have longer internal condyles.

The muscles of the female are more flender and delicate, they are, in fact, less dense, fatter and motiler. These organs are less prominent, and their swellings, partaking of the general softness of the female constitution, have not that character of vigour which their rough prominences and strongly marked intertices imparts 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 adipous tisse is more abundant in the female; and this, joined to the smaller prominence of the muscular bellies, 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 sensibility 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 differences in organization. The reader may refer on this subject to the Histoire naturelle de la Femme, by Moreau, 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, 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 impressed, 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 denticion, puberty, and adult stature 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 articulation can be performed more rapidly. It has also a peculiar quality or tone, which, in many instances, connotes an inexpressibly attractive charm. "Of all acute voices," says Rouelle, "it must be allowed, in spite of the prejudices entertained by the Italians in favour of the cullat- ti, that none are equal to those of women, either in the extent or beauty of the tone." The anatomy, 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
GENERATION.

The differences which we have enumerated are not very distinctly perceivable, until the two sexes have reached the epoch 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 EXUMA); 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 fleshly 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 primary and secondary; the former include the differences in the parts of generation themselves, which are originally formed in the embryo, 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 male 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 female sexes are of a peaceable nature; e.g., the legs 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 distinguish 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 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 fleece, like that of the ox or spayed heifer, is generally much finer in the fibre, 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

fesk rigid, like all the other parts of the female, young girls ought to speak sooner than boys, &c. Among the several distinctions belonging to this head, we must notice the greater prominence of the thyroid cartilage in the male.

The texture of the skin is more dense and compact in men, whiter and more expanded in women. In brunettes, particularly, it has a softness and polish, which convey the most voluptuous impressions to the organs of touch. "Perfections," says Winckelmann, "who prefer such females, are captivated through the medium of feeling, rather than of vision." The skin in woman possesses also a transparency, which allows the colour of the blood to be discerned in the superficial veins, and produces the beautiful azure tint, which contrasts so charmingly with the clear whiteness of other parts. The cutaneous secretion has been considered to differ in the two sexes. "La transpiration parait beaucoup moins abondante chez les femmes; elle a surtout, dans certaines parties, une odeur, qu'il ferait difficile d'exprimer, mais qu'un odorat exercé paraissait affinement à distinguer chez les femmes qui jouissent avec plénitude de tous les attributs de leur sexe, et qui font femmes jusque dans leur atmosphère." Moreau, l. i. p. 171.

The skin of man is always, comparatively, more deeply tinted; it is thicker, rougher, and covered with more numerous hairs. In our account of this organ, too, we have to mention a very characteristic attribute of the male sex, the beard.

This production, which adorns the figure of the male, in the human species, is more or less abundant in different subjects. It does not begin to appear until the age of puberty, and is not completed developed until after some years. Its great thickness depends, perhaps, on the habit of cutting it. In old age a similar production appears in some women; here, however, it is dispersed irregularly, and has not the thickness which it possesses in man; nor does it ever acquire the fame length. Yet rare examples have been known of women with long beards. A case of this kind is mentioned in the Anatomie Descriptive of Bichat, tom. 5. p. 165, as having been seen at the hospital of the Ecole de Medicine. The woman was forty years of age; her breasts were well-formed, and had had a child. Her beard was as strong as that of a man, and numerous hairs covered the lobuli of the ears.

The characters of sex in those organs which are immediately employed in the generative functions, will be exhibited in the course of this article. We have only to observe further, that the circumference of the anus, which is covered with hair in the male, is smooth in the female subjét.

The reader may refer, on sexual distinctions, to Rouflel, Syllene physique et moral de la Femme; to the works of Moreau and Cabanis; to the French Encyclopedia, Yverdon edition, art. FEMME and VIEUX; to Ackermann, De discrimine sexum prater genitalia. Moguntio 1788, 8vo.; to A. F. Nolte, Diff. infus. mentulae quasdem circa sexus differentiam. Gottin, 8vo. The differences in the general habit and appearance of the body, the softness, delicacy, and inferior fineness of the female, as compared with the strong fineness of the male, may be seen in the two figures, hatched to have been drawn by Taine, contained in Vedius, De Corp. hum. Anat. Basil, 1442: also in the 18, 20, and 32 plates of Bidloo's work, and in the Cours complet d'Anatomie gravé par M. A. E. Gauthier, et expliqué par M. Jadelot; Nanc, 1773, folio. The unrivalled artists of Greece could not fail to perceive the same distinctions, which they have expressed most admirably in some of the finest monuments of their art, as in the Venus, the Apollo, and Hercules.
they seem to approach each other in appearances, and acquire a resemblance to the hermaphrodite. Respecting 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 testes 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 male, 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 marlin, which is a monstros 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 Pheasant," 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 flag; whose amours are conducted in so splendid a style, and evince to remarkable an exuberance of vitality. When he is deprived, at an early age, of the sexual attributes, none of the vigour of the rutting leafton is displayed; the muscular flesh is softer, and the horns are either arrested in their growth entirely, or are imperfectly formed. Ruffel castrated a very young flag, 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 flags 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 possess an assemblage of peculiar characters, all of which have not a very direct relation to the functions of the generative organs. Not only are the sexual desires 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 mutilation 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 to the most powerfully to its 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 these 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, a softness and lankiness 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 castrati. The physical condition is generally accompanied in these individuals with a perfectly corresponding moral state. All these points are fully substantiated in the following account of a marine soldier, 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 mens 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; 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 castrated 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 mens veneris loaded with fat; no penis; a prepucium, 7th of an inch long; and under it the mens urinarius, but no vagina.

There was an imperfect ferotum, 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 fetus. 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 deferred, except in the prepuce being an inch long."

An interesting case is mentioned in the Mémoires de la Société médicale d'Emulation, t. 3, p. 293, which tends to confirm the preceding observations. A young man, aged 23, has no testes in the ferotum, 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 on each side of 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 mutation, have considerable
influence on the effects of the process. The complete re-
moval of all the external organs is a much more decisive
method of annihilating the propensity connected with them,
than any partial amputation, or compression, or ligation of
the spermatic cords. The operation is also more effectual,
when performed in early infancy, than after the period of
puberty. Venereal desires have been known to subside in
considerable force, and with the usual external signs, after
the removal of the teales in the adult. The moral effects of
this mutation have been strongly depicted by Cabanis.

"Eunuchs are the vilest class of the human species; cowardly
and knavish because they are weak; envious and malignant,
because they are unfortunate. Their understanding shows
the absence of those impressions, which give to the brain so
much activity, which infuse it into an extraordinary pro-
portion of vital energy, which cherish all the expansive and
generous feelings of the soul, elevate and direct all the
thoughts. Nature is almost the only very imposing excep-
tion to this rule; he is almost the only eunuch whose name
appears with glory in the page of history. Solomon, one of
the Hebrews of Balthazar, 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 corrup-
ting 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 occasions 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) mea-
sured only nine inches from the offia finger across the facrum.
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 pu-
berty, either in mind or body, even at twenty-nine years of
age." The removal of the ovaries has been most rarely
practised in the human subject; probably the only case in
which it has ever been done is that recorded by Mr. Pot,
where these bodies were contained in inguinal herniae. A
healthy young woman, aged twenty-three, large breasted,
float, 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 op-
eration, which is now some years." (Pott's Works, vol. iii.
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 ob-
erved to acquire the plumage of the cock in some instances.
This has been noticed in wild individuals; but Mr. Hunter had
three opportunities of ascertaining the fact by his own exami-
nation. He further mentions a pea-hen, which, having 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 spurs 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 Hermaphrodites, in the Philos. Trans.,
1799. "We may conclude," says Mr. Hunter, "that this
change is merely the effect of age, and obtained to a certain
degree in every class of animals. We find something similar
taking place even in the human species; for that increase of
hair obserable on the faces of 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 feses, which, at an early period, had little to distinguish
them from each other, acquiring, about the time of puberty,
secondary properties, which clearly characterize the male and
female; the male at this time receding 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 receding from the original character of the animal,
and approaching in appearance towards the male, or perhaps
more properly towards the hermaphrodite." Observations
on the Animal Economy, p. 85.

Nothing can be more absurd than to seek for any mech-
anical explanation of these accidental phenomena, or even of
the more regular phenomena, of which they interrupt the
courtesy, at the same time that they elucidate the law. They
cannot surely be derived from the structure of the organs to
which they belong, nor from the known nature of the li-
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
ocult 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 sublimating,
for the opinions of the ancients, other more dogmatical
explanations, have given rise to more important and danger-
ous errors: they have inured 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 presence and
influence of the uterus and ovaria; it takes place infallibly
when these organs are originally well formed, and are de-
veloped in the natural order. This weakness of the muscles
impairs an instinctive disinclination for violent exercises; it in-
inclines the individual to amusements, and, when the age admits of it,
to sedentary occupations. The greater separation of the
hips renders progession 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 by a circum-
stance in their organisation, which might be regarded as
trifling, and which can hardly be distinctly observed at an
early age. Again, the habitual sense of weakness impairs
her confidence. Not poising the means of acting on sur-
rounding objects by direct force, woman seeks for more in-
direct methods; in proportion as she finds herself less cal-
culated to exit alone, does she attempt to attract the atten-
tion of others, and to fortify her own existence by that of
those surrounding beings, whom the judges most able to
protect her. These observations would be almost sufficient
to explain the dispositions, talents, 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 conseqently 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 the immediate propensities depending on their organization, we see in a manner a new physical and moral fytem developed in them. They perceive their own weak-ness; hence the necessity of pleasing: from the latter circumstance arises the continual observation of all that is passing around them, also their dilamation, their artifices, their manners, their graces, in a word their coquetry, which, in the present sytem of society, must be regarded as the embellishment or result of their good and bad qualities.

For reasons exactly contrary to those which have been just explained, boys acquire the opposite original and characteristic 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 disapprovable and irksome to them: they want lively motion, and they indulge in it with impetuosity. 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 these determine them to prefer. Now, the passions and ideas of the grown man are on the other hand materially developed and completed by the immaturity of the organs, and the personal experience of the individual. See Cabanis, Rapports du physique et moral de l'Homme, memoire cinquieme.

But nothing hitherto explains us how modifications of a general nature can depend on the conditions of certain peculiar organs. We must then accord a little higher, and inquire 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 sytem. 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 neighbourhood of the viscera, where the nervous influence must be the most considerable. The epigastrie 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 trunks. 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 viscera, 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 sytem.

Secondly, observation shews us that the nervous sytem (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 some of its most sensible extremities. The loss of one sense 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 sytem feels and reacts, and hence arise new habits evidently connected with the unusual im-

preffions 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 decades of the cheif, 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 animal than in others; and the greatest aptitude to those avocations, which demand either considerable strength and activity in the imagination, or long continued and profound meditation, is often experienced in a state of disease caused by the deranged functions of some of the abdominal viscera. 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 those 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 (layers) of the peculiar sensibility of the generative apparatus, viz. the ovaries and testicles, are of a glandular structure, that the various parts of the generative sytem are the principal subjects of the variations; and that the condition of this sytem 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 sytem, where the glands are dislinguished by their great sensibility.

Again, it has been alleged that the seminal fluid formed in the testicles, when absorbed and conveyed into the circulation, affects the general mass of blood. At all events the commencement of this fonction is marked by important changes in the voice, the muscular motions, and the physiognomy, 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 teles. That an analogous fluid forms in the ovaries, and either furnishes the materials of the embryo, or contributes to their formation, and that its aborption 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 incontestible. Lastly, in explaining the differences in the parts in the two sexes, we must assume peculiar dispositions in the original formations of the nervous sytem, as well as in the cellular organ, the muscles, and bones. 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 simple facts, and be admitted as such, without attempting to trace them any higher.

Hermaphrodism.—Having compared together the two sexes, and mentioned the most remarkable circumstances which dislinguished 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 flexibility. The Grecian 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 her-

Hermaphrodites.
G E N E R A T I O N .

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 attitude, 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 breasts, in the features, in the elegance of the figure, and the softness of the contours. (Winckelmann, Histoire de l'Art, 4to. 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 hermaphroditism, classifies the chief-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 hermaphroditism 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, tome 3.) The fabulous account of the transformation of Hermaphroditus and the nymph Salmacis 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 hermaphrodities, recorded in various medical works, renders it necessary for us to classify them under certain heads. 1st. 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 vesicular females, prostates, urethra, and penis, should exist in the same individual with the organs employed for the purposes of conception, of receiving, nourishing, and expelling the fetus, such as a well-formed vagina, uterus, ovaries, and Fallopian tubes. The difficulty, and even impossibility of such an union, has been already recognized by Haller and Plancher. Medical authors have indeed related cases of women, who, after having many children, had impregnated other females; (see Mollerus, Traité de Hermaphrodit. cap. 2.; Blancard, Collect. Medico-Phys. cent. 3. obv. 80.) 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 neat cattle; and it has also been seen in the dog, the cat, and the goat. The individuals, in whom such appearances have been noticed, are 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 Petit in the Memoirs of the Academy of Sciences for 1729, as exhibiting a mixture of organs, was clearly a male; and that related by Maret in the Mémoires de Dijon, t. 2, p. 177, belongs to the same class. The following case, described 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 accounts of hermaphrodites can be received, except on the faith of dissection performed by experienced anatomists. The individual was essentially a male, and offered some appearances of the other sex, not from the addition of any organs, but from an unusual distribution of some parts of the male apparatus. He was received in society as a woman, and was connected by a voluntary association 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 assemblage of the male and female properties. The bulk has a completely masculine appearance; the chin was covered with firm hairs, very analogous to a beard; the neck was thick, the chest broad, the bosom slightly fleshy, and the nipples exactly like those of a man. The lower half of the body presented a contrast to the character. 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 vesiculae seminales imperfecta, 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 male, entirely incapable of any sexual function. See Journal de Médecine par Sédition, tome 2, p. 519.

The last instance of mixed organs, which we shall quote, is mentioned by Dr. Balilie, 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 the sex was likewise 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 capable of any had health, but only came to the hospital, in order to comply with the wishes of her sisters. Various medicines were tried without effect, which led to the suspicion of the being impersonated, 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 nymphæ. The labia were more pendulous than usual, and contained each of them a body resembling a fistulous of a moderate size, with its cord. The mamma resembled those of a woman. The person had no desire or partiality whatever for either sex." (Morbid Anatomy of some of the most important Parts of the human Body, 2d ed. p. 410.) This narrative leaves very little doubt that the individual was a male, with the generative organs so imperfect as not to have exerted their usual influence on the frame in general: there is no evidence of any female organ 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 exercising
ercising the generative functions of both sexes—of impreg-
ating or being impregnated—but also, that there is no
clearly described instance of the smallest mixture of organs
in any human person, ascertained by actual dissection, and
testified by persons of competent anatomical skill. All the
supposed instances of hermaphrodites must then be referred
to one of the following classes; in which unusual situations
of certain organs, vicious conformations, various monstro-
fities, imperfectly developed male organs, or a greater pro-
minence than usual of some female parts, occasion a devia-
tion from the accustomed type, supposing to constitute her-
maphroditism, very capable, when afflicted by lies and fraud,
of imposing on those who know 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 sound spirit of criticism, founded on a more accurate
knowledge of natural appearances, reduces to their just
standard those singular deviations from the ordinary type,
from which ignorance, credulity, and a love of the marvell-
ous, have drawn such extravagant and ridiculous con-
sequences.

2d Clafs.—Male individuals, with unusual formations of
the urinary and generative organs; (androgynus.) Where
the ordinary type is considerably changed, 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-
 rally predominates very clearly in these cases, and the am-
biguity depends commonly on the testes being contained in
separate parallel folds of the skin; the penis being im-
perfect; 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,
is considered as a large clitoris; the folds of skin holding the
testes very much resemble the female labia, and the red slit,
behind which the urethra ends, is tolerably analogous to the
vagina. The imperfection of the penis, and the opening of
the urogenitary ducts near the perineum, at which their con-
nections escape, deprives these individuals of the power of
procreation; and the illiberity of their marriages, if they en-
ter into that state, in spite of their imperfect formation, aris-
es entirely from this cause. The testes and vulva of fem-
nales appear to be perfect in these 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; Aristotle having observed it in the former. The
reader will find examples in Haller’s Commentationis de Her-
maphroditis, where a vast number of instances is quoted;
in Wrisberg’s Commentatio de Singulari genitalium Deform-
itate in pueru Hermaphroditum Mentiens; § 7, note b: in
Moreau Histoire Naturelle de la Femme, tom. 1. p. 224:
in Mertrud, Differtation sur la fausse Hermaphroditte,
qui paroit aux yeux du public, Paris 1749, folio: Agout,
Observations sur l’Histoire Naturelle, la phiiique, &c. avec
des planches imprimes en noir, Paris 1740. 4to. 1752.

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

Other less essential deviations from the accustomed organi-
ization have given rise to the opinion that the individuals were
hermaphrodites. A figure, 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. Wrisberg knew an instance of this kind at
Göttingen: the individual was always deemed a herma-
phrodite, but he had the natural defiles 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
to the scrotum, by a particular formation of the integu-
ments, has occasioned persons to be reputed hermaphrodites.
In thefhe 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 felt free by a
sur
gical operation.

The last description of males, supposed to be hermaphro-
drites, are those in whom the urinary bladder is deficient,
together with the lower and anterior portion of the abdo-
nominal muscles and integuments, and the lymphatics pubis,
a red and tender mass of an irregular and fungous-like sur-
face, with the ureters opening on it, is placed at the lower
part of the abdomen. Considerable alterations take place in
the generative organs, in consequencc of this deformity. The
urethra is deficient, and the penis consequently imperfect.
The femoral ducts open near the fungous mass above-men-
tioned, or on the open surface of the urethra, or even ter-
minate in blind extremities. As the tuberousities of the if-
chia are at an unusual distance from each other, the crura
denis are concealed within the body for a greater length,
and the pendulous part of the organ is extremely short, felled
exceeding two inches in length, even in the adult.
The urethra appears as if it had been slit open, forming a
band or groove, instead of a perfect canal, and rendering
the glans penis blind. 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 cavernos, it has commonly passed along the upper
angle, giving the penis and glands the appearance of being in-
verted. That the part now described is really the urethra,
is evident from its vesicular surface, with lacunar opening
upon it, from the presence of the caput gallinama, and of
the openings of the femoral ducts. In consequence of the
labia being bifid at its upper surface, the prepuce 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 scrotum, in others in fossa of integument resembling
the labia of the female; and in some do not descend. The
ferotum is rarely pendulous, being increased in breadth in
consequence of the separation of the offa pubis. 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 producing the feces; in con-
sequence of the shortness and imperfectior of the penis,
and the femoral ducts opening externally. See Dr. Duncan,
jun. on this subject, in the Edinburgh Medical and Surgical
Journal, vol. 1. pp. 43 and 152: where he has collected to-
gether a vast number of cases.

3d Clafs.—Female individuals; (androgynæ.) An un-
usually large size of the clitoris, is one of those caufes which
have led to mistakes concerning the sex. This is not a com-
mon occurrence in these countries, but is said to be much
more frequent in warm climates; in so much that in a surgical
operation for removing the part is described by the Arabi-
aeas. These individuals are perfect females in all other cir-
cumstances of their organization, and the menstrual discharge
sufficiently characterizes them. In many of the recorded in-
stances of this description, there is probably exaggeration,
as any enlargement of the clitoris can hardly make it suffi-
ciently
GENERATION.

cently like a penis to give rise to mistakes. A gipsy applied to Columbus for the removal of a clitoris which incommoded her. The famous hermaphrodite negroes of Angola, exhibited in London, was in the same case with the gipsy mentioned by Columbus. Parfons has collected many facts of this kind. Mr. Home relates an instance in a female negro. 'She was of the Mandingo nation, 24 years of age, whose breasts were very flat; she had a rough voice, and masculine countenance. The clitoris was two inches long, and in thicknesses resembled a common-fized thumb; when viewed at some distance, the end appeared round, and of a red colour; but, on a closer 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 before; 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 natural state.' A gentleman, who had practiced midwifery among the negro women, stated that an enlarged condition of the clitoris was common amongst them. Parfons and some others, in consequence of the structure just described, have ascribed all hermaphrodites to the female sex. Whether this unusual lize of the organ can be produced, 'per celeratum abuam clitoris' is very doubtful. In order to avoid all mistake concerning sex in newly born children, it must be remembered that the clitoris is proportionally very large at that age.

A prolapsus of the uterus is another circumstance which has occasioned females to be deemed hermaphrodites, and even to be publicly exhibited as such. A person of this kind came to Paris in 1693, dressed as a man, and wearing a sword. She pretended to have the organs of both sexes, and to be able to employ both, and exhibited her person to the curious for a small gratification. Besides the numbers who took up the common opinion of her being an hermaphrodite, and who could not be supposed sufficiently well-informed to judge of such a subject, several physicians and surgeons fell in with the vulgar sentiment, and gave certificates which prove incontestibly, that a great reputation may be acquired in the profession, without any real talents, or any large stock of solid information. Saviard, after inspecting the parts closely, found that the case was a prolapsus uteri, which he reduced. When the female had recovered, the presented a request to the king for permission to take again the female dress, in spite of the magistrates of Toulouse, who had ordered her to clothe herself as a man. See Saviard, Recueil d'Observations, obi. 15.

An instance of the same kind is related by Mr. Home: 'A French woman had a prolapsus uteri at an early age, which increased as she grew up; the cervix uteri was uncommonly narrow, and at the time I saw her, when she was about 25 years old, projected several inches beyond the extremity of the vagina; the surface of the internal parts, from constant exposure, had lost its natural appearance, and resembled the skin of the penis; the orifice of the os tincte was mistaken for the orifice of the urethra. This woman was known as a curiosity, and in the course of a few weeks made £cet. I was induced by curiosity to visit her, and on the first inspection discovered the deception; which, though very complete to a common observer, must have been readily detected by any person intimately acquainted with anatomy. To render herself still more an object of curiosity, she pretended to have the powers of a man.' Philos. Transact. 1799.

We have already mentioned some instances where the generative organs, although belonging clearly to one sex, had been imperfectly developed, and consequently had not produced their usual effect in modifying the form of the body, and impressing it with the sexual character. There are other cases, in which men or women, having their organs apparently of the accustomcd magnitude, partake respectively of the characters of the other sex, probably from the cause alluded to, of the sexual parts not exerting their full influence on the frame. Such individuals may be accounted neuters; and form, in the human subject, to resemble the free marten in neat cattle, where there is a true mixture of organs, but they are so imperfect that organization is not influenced by them, and the form of the individual differs both from that of the bull and cow. The persons thus circumstanced are often deemed by the vulgar hermaphrodites.

All the cases of supposed hermaphrodites may be referred to one or the other of the heads now described: they will be found to be either males, with some unusual organization or position of the urinary or generative apparatus; or females, with a long clitoris, or prolapsed uterus; or individuals, in whom the generative organs have not produced their usual effect in influencing the development of the body. Thus, it is evident, that instead of combining the powers of the two sexes, they are, for the most part, incapable of exerting any sexual function. Yet ignorance and superstition have marked out these individuals, already sufficiently unfortunate from their defective organization, as the objects of persecution, and have subjected them to the operation of the most absurd and cruel laws. The ancients, regarding them as an impure and ominous kind of monsters, dispatched them by the most barbarous deaths. It appears from Diodorus, that they had been burned by the Athenians and Romans. By the edicts of Conimantine and other princes, they were beheaded, drowned, or banished to desert islands. Livy informs us that a newly born child, of which the sex could not be ascertained, was thrown into the sea. (L. 31.) Further information on this subject may be derived from Gaspar Bruhin, De Hermaphroditorum monstroso et curioso partum natura, Ex Theologorum Jurisconsultorum Philosphorum, et Rabbinorum sententia, libri duo, Francof. 1629, 8vo. These absurd notions and practices have at present disappeared; but the subject is important on many accounts, as these unusual deviations render the sex of an individual often doubtful, and impose even on professional persons. The decision may be important in deciding the employment in life of an individual, the defec of property, the fuits for religious functions, particularly for the male or female religion in the Roman church, and the judicial decisions concerning impotence or fertility. We therefore add a few observations on the grounds of distinction in such circumstances. The greatest difficulty is experienced with respect to newly born children; for many things afford our determinations in the adult. The beard, the hair surrounding the arms, the desires excited by the presence of women, the testes and their cords, and the comparatively greater breadth of the shoulders than of the pelvis and hips, shew us that the individual is a man. The smoothness andsoftness of the body in general, the increase of the beard, and of the hair from the arms, the meatal discharge, the want of testes, and the superior breadth of the hips, prove the individual to be a woman.

A male, with a fissure in the perineum and an imperfectly developed penis, may be ascertained by the size of the penis, by the different organization of the preputium from that which covers the clitoris; the absence of nymphae and labyve, and probably the presence of testes. The different relation of the fissure in the perineum to the penis, from that of the...
meatus urinarius to the clitoris in the female, will afford the
decision, as also the want of power to pass an instrum
ent towards the situation of the uterus.
The smaller size of the clitoris, and its different shape;
the connection of its prepuce to the hymen, and the
presence of the latter parts; the separate opening of the vagina
and meatus urinarius, and the presence of the hymen; the
absence of tefficles, all prove the individual to be a woman.

An adhesion of the labia to each other at their convexities
may cause a difficulty in deciding; but here the absence
of the penis and tefficles, the discharge of the urine at the upper
corner of the labia, and the line of union between those folds,
shows us the nature of the case.

Much information on the subject of hermaphrodites may
be gained from the following works. Partors' Mechanical
and Critical Enquiry into the nature of Hermaphrodites:
Pictich, Gedanken von den Zwittern, in the Old Hamburg
de Chirurgie. Haller, num dentur Hermaphroditum, com-
mentarius, in the Commentarii faci. reg. scient. Gottingen,
tom. i.; or in his Opera Minora, vol. ii. Hunter on the Free
Man, in his Ob. on the Animal Economy. Home, the
Defilaction of an Hermaphrodite Dog, with Observations on
Hermaphrodites in general. Philos. Transact. 1799. Moreau
Hillore Naturelle de la Femme, tom. i. p. 211, et
seq. Wirser, Commentatio de singulari genitalium de-
formitate in puero, hermaphroditum mentiente, in his Com-
mentat. vol. i. p. 504, et seq.

Male Organ of Generation.—In the human subject these
constitute the tefficles, vesiculae femininae, prostate, Cow-
per's glands, urethra, and penis; making up a secretory ap-
paratus, which is double, consisting of a right and left or-
gan, in the two former parts, and single in the latter. The
peculiarities of the apparatus consist in the small quantity of
fluid which it furnishes, in the long periods for which this
fluid is retained in its reservoirs; in the particular condition
of the organ defined for its emission, essentially necessary to
that act; and in the physical feeling which accompanies the
act.

The Tefficles.—These organs, placed externally to the ca-
vum of the abdomen, and left protected against external in-
jury than molt other important viscera, are surrounded, each
of them by a considerable vascularity bundle, called the per-
titic cord, and contained in a kind of bag or cavity formed of sev-
eral membraneous layers. A middle septum divides the interior
of the bag, and separates from each other the right and left tefficles,
with their coverings, which are double with the exception of the outer one.

The latter, formed by the integuments, and
called the scrotum or purse (in French les bouries) con-
stitutes a single bag, which envelopes all the others. The
scrotum is attached to the upper and front part of the pelvis,
unconnected in every other situation, continuously lateral to
the inside of the thighs, in front to the penis, and separated
behind from the anus by an interval of two or three inches,
called the perineum. A small fold of the skin under the penis,
a slight groove below, and a prominent line behind, conti-
ued into the raphe of the perineum, mark out successively,
on the external surface, the symmetrical division of the
organ. Yet the right side of the scrotum is almost constant
ly more elevated than the left, in consequence of the cor-
responding peritestic cord being shorter, and the tefficles nearer
to the ring. The scrotum is soft to the feel, and elongated,
so that the tefficles take place and hang long, in warm wea-
thor, in old persons, after coition, and under the action of
dry caustics 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
coition, and in a strong, vigorous state of the body; con-
sequently, at such times, it is applied more exactly to the
teles, and, drawing these organs gently upwards, shortens
the cords. 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 tefficles succeed each other in the fol-
lowing order: 1st. The cutaneous investment, or scrotum; 2ndly.
The cellular layer; 3dly. Membrane of a fibrous ap-
pearance, common to the tefficles and cord; 4thly. The serous
membrane. The reason why the dartos is not enumerated
among these coverings will appear presently.

The scrotum is continuous with the integuments of the
inside of the thighs, the perineum, and penis. It is dis-
lignified by a brownish hue from the rest of the integuments,
but follows in general the tints of the latter, being always
darker in colour. A few short hairs are scattered over its
surface, and their bulbs, obliquely implanted, form feable
prominences from the thinness of the skin, which are not
effaced by extension of the organ. In its general organiza-
tion the scrotum resembles the skin; but it is very thin, so
that the veins of the subjacent cellular tissue are visible
through it. The vital properties of the scrotum 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 same in both in-
fances. It constitutes the cutis anserina 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 con-
traction is in the integuments, and not in any more
deply-seated part; they feel dense and firm at this time,
instead of being soft and loose, as in their ordinary state.

The tefficles and cord are surrounded in their situation by a
copious and loofe layer of cellular substance, placed im-
mEDIATELY under the skin, and constituting, where it divides the
two tefficles from each other, the septum of the. This is rather
more dense immediately under the cutaneous integument, and
looser at the surface of the tefficles. Several blood-veffels
ramify through it, particularly veins; and hence arises 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 seen in this substance, and enable
us to explain the acute sensibility observed on the removal of the
tefficles in surgical operations, a little fat is seen near the
ring and the urethra; but it is completely absent from all
other situations. Here, as in the penis, the eye-lids and
some other parts, the abundant deposition of fat would in-
tere with the functions of the organ; and its absence in
these situations seems to indicate the design and foresight
employed in the construction of the body as fully as the par-
ticular construction of any parts can do. However the size
of the body in general may be increased in corpulent persons,
the tefficles, penis, &c. always retain the same dimensions.

The absence of fat renders these parts more especially sub-
ject to the watery depositions of anaetasis; such effusions
often manifest themselves first in the scrotum, and that organ
is generally very much increased in bulk when the anaetasis
is considerable. The impulsion of air through an opening in
the scrotum demonstrates very well the nature and extent of
this cellular layer; by diffusion of this kind it resembles
cotton in appearance. Maceration in water may be employed
for the same purpose; as the fluid penetrates very minutely into the cellular interlucrices. It is continuous with the similar covering of the perineum, and with the cellular substance of the perineum and groins; so that air pales from it into these situations.

The cord and testis are closely enveloped by a condensed cellular covering, which defends from the neighbourhood of the abdominal ring, and includes the organs just mentioned, together with the membranous coverings of the latter; it constitutes the thyroid or epyphoid 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 scrotum 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 to such a degree 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 scrotal ruptures, to which it gives a complete external covering. Camper has delineated it very well in his voluminous plates edited by Socamerring, and he describes it in the following paragraph; "Cremailleres ligatit muculi sunt, ab obliquo interno et transverso abdominis oriti, per involucrum membranaceum labi cutis feroti dipheri, quocum velamentum efformans, fumiculum spermaticum et telem undeque cingens, quoque in hermiovis, crassius tamoxque sit, et ex multis fibi invicem impoisit laemelis comitare videtur, cum chirurgia hernias attingitum. Velamentum illud facile faciit hernie digitis separatur; formiis autem adhaeret vaosi spermatici." *Icones herniarum,* p. 13.

The serous membrane of the testis is called the tunica vaginalis, and the name 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 into it, 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, and all the parts of the spermatic vessels, and the whole testis, and giving to these parts a smooth external coat. The tunica vaginalis therefore may be divided into two parts; viz. an anterior 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 very where 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 seizable fluid in the ordinary state of the parts. 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 scrotum contains two of these glands, a right and a left one; but this number is not invariably. We shall explain hereafter how it may happen that the scrotum 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 adduced 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 assertion 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 chastity 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 senile 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 secretion. Again, there are differences of volume from original formation. The right and left glands are not always of the same size, nor is the right particularly observed to exceed the left, as some have asserted. The figure of the part is pretty exactly oval, while 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 anterior and posterior. The flat fides, 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 testis, which are anterior and posterior, are placed obliquely, so as to slant from above backwards and downwards. The anterior edge is sometimes described as the interior, and the posterior as superior. 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-veissels, smaller in the middle and enlarged at its upper and lower ends, and reflected at the latter, to form the vas deferens. Its upper extremity is called the caput epididymis or globus major (tête de l'épididyme); and this adheres very firmly to the upper end of the testis, being placed rather behind than almost, and may be separated from the rest of the organ by a more superficial plane, forming a fibers part of the bag 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 the vas deferens. The spermatic cord is attached along the posterior edge of the gland, and the greater or lesser obliquity of the testis depends on the mode of its connection. A cord, composed of the same parts, supplies each testis in its place, but it is rather longer on the left side; a circumstance which has been noticed by painters and anatomists. The pathologist ascribes to this circumstance the frequent occurrence of urocele on the left side of the body. The distance of both organs from the ring is variable, and depends on the size of the perineum, and the cremaster muscle. These two parts generally contract together. The configuration of the gland is felt to the feel. As it is covered almost entirely by the serous 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 pulpy mass, considerably softer than the parenchyma of the other glandular organs, contained in a strong fibrous membrane, which determines the exterior configuration of the part, and the confinement which it presents on examination. This membrane is named the tunica albuginea. It is seen through the reflection of the tunica vaginalis, which envelopes the testicle, 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 so 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 describe 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 mals are slightly subdivided into smaller portions. Some of these productions seem to consist of blood-vessels. The structure of this part consists in amongst 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 closeness and firmness of its texture explain to us the peculiarly hard feel of the inflamed testis, as the membrane yields with difficulty to the distention produced by the swelling of the contained vascular parts. It is manifestly thicker where the seminal tubes penetrate it; and in this situation we observe the corpus Highmori, concerning which we have further observations to make below. The albuginea possesses extensibility, and the corresponding contracility: 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 cartilage. 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 pulpy matter, of a light brownish-yellow hue, and divided into small portions or lobuli. Imperfect cellular lepta, 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 hue, running along the back edge of the testicle, from above downwards. Such are the appearances exhibited in the recent organ, without any distention or preparation. Its substance is very soft, so that when dried it loses more than eight-tenths of its weight. A more accurate examination, particularly with the assistance of maceration and putrefaction, discover that all this pulpy mass is made up of convoluted serpentine threads possessing some firmness and connected together by a very soft cellular substance. These, which are called the tubuli or ductus feminiferi testis, seem about the size of an ordinary fowling 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 straight direction to the cellular line 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 1-2200th of an inch; or 1-120th when injected with quicksilver. By the calculations of the fame 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 326 feet and 4 inches in length. The convolutions and turns of the ducts are so numerous, that they do not continue their course, in the same straight line, for more than 1-45th 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 Highmori. Many anatomists have described it as tubular, and have assigned 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 Highmori 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. 445.

In these the tubuli feminiferi testis terminate; and they constitute the rete vealculorum of the organ. The ducts contained in each part of the tubuli feminiferi end in one straight tube, which terminates in the rete testis. A certain number of tubes, called the vas effrentia, convey the semen from the rete vealculorum to the commencement of the epididymis. Observe 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 distention 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 base 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 figure, is distinguished by its greyish colour from the shining whiteness of the testis. Being placed at the point where the cord is attached to the testicle, it is surrounded by blood-vessels, of which several 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 connection is looser. Its structure is much more easily unravelled 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 capital, 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,
 Cobb, 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, till 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 proceed the tube can be drawn out to a surprising length, to five cfs, according to Dr Graaf, to 400 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 1-30th 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 1-30th of an inch, 11,100. (De femine et testibus in varis 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 vesicles tubuli sericiferi, to the termination of the epididymis in the vas deferens, the semen goes through a series of tubes, which are folded 16,890 times, and, if extended in a straight line, would exceed 42 feet in length. Moers, lib. cit.

The smallness of these tubes prevents us from ascertaining their texture, or the nature of their sides. The tubuli sericiferi possesses considerable firmness, as we may ascertain by extending them until they break, and by observing the column of quicksilver which we support, when we inject them. The tube of the epididymis possesses firm and strong sides, 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 fize is equal to that of the tube of the epididymis itself. This circumstance was first noticed by Hal- ler, who called the vesel *vasculum aberrans.* (Progr. de was. feminal.) He did not undertake to determine its termination or nature, observing that it proceeded along the cord, "in cuncto line: an lymphaticum?" The existence of the vasculum aberrans has been confirmed by Monro, who injected it in four out of sixteen 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," says he, "a lunis nature, and either forms a cul-de-sac, or, after many convolutions, returns back again upon itself, and terminates where it began. 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 dissection, the cellular membrane had been removed. It may be compared with the diverticulum illi, so frequently met with in the human intestines." Anatomy of the absorbing Vessels.

**Vessels of the Testicle: Spemamic cord.**—Under the inferior extremity of the kidney, and about the middle of the psoas major muscle, we observe a fasciculus of blood-vessels, 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 over 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 the fæcal transverfalis. 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 infection into the tubes. 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 fæcal 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 bunooncles, 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 fetal 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 accompany 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 foment cell:ellular 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 by the ancient physicians, and called by them the *feminal vessels.* They would probably have escaped the diligence of the disector, had not the importance of the part, which they supply, been more attended to, than the fize 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, informally, that this has been described as the accustomed origin. Often a smaller branch from the renal joins...
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 capillaries, but is behind the vena cava, and is 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 testis, from the epigastric, or from the circumflex abdomen. 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 testis, on account of the supply derived from the external vessels; but as these are very small, the cerebral powers of the organ are lost." Element. Physiol. v. 7. p. 430.

It has been ascertained by many anatomists, and some of considerable celebrity, that the spermatic arteries and veins communicated together; and Eulachian has drawn large communicating channels. That injection will sometimes pass from one order of these vessels into the other, when destitute of 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 capillary, or a lumbar, or the hemisemuy. 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 so 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 these arteries, which arise from the spermatic, join the vein. Valves are found in the spermatic veins, but none at their terminations: the tendency to the formation of varices in the spermatic veins, shows the necessity for the exclusion of valves. The veins of the testis, derived from the epigastric, communicate with the spermatic, and with those of the penis.

The absorptions of the testicles are numerous and large, but have not been long known. Nakc had demonstrated them by inflating the spermatic veins, and Monre rejected them when he had thrown quicksilver into the vas deferens. He observed four or five valvular veins arising from the rete testis, and ascending the cord. Haller candidly admits that he did not know much of them. "In hominie aliquoties vidi maffcula, non tamen vaide numerosa, in funiculo feminilium cum vasa ascendentia, valvat, ut tamen neque origine, neque fumus fatis accurate viderem." (Elem. Physiol. v. 7. p. 435.) Mr. Crickhank has given us the most perfect account of these vessels. "The absorptions 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 absorptions injected with quicksilver; perhaps there is not any part of the body where the absorptions 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 absorptions, 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 absorptions, which arise out of the rete testis, are exceedingly large, and appear to have no connection with its coat. 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 seminales. 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 glans, and the testis. I soon found that it was not running into the tubuli, but into some vessels, which mounted along the cord: these I soon perceived were absorptions. I have also injected them from every part of the epididymis, from its superior extremity, from the middle, and from the lower end. The absorptions, 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 different 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 viscera, to receive its blood-vessels and nerves from the nearest trunks, and to return its absorptions to the nearest glands." Anatomy of the absorbing vessels, p. 142.

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 destination. They are rather numerous than large. They are produced from the renal plexus chiefly, with additions from the mesenteric and hypogastric plexuses, and from the trunk of the great sympathetic. They are closely connected to the vessels in the cord, but can hardly be traced to the testis. The spermatic and cremaster are supplied by the lumbar nerves. Although the testis does not appear to 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 CRISTMASTER. A soft and loose cellular substance unites the parts which have been just mentioned; it resembles that of the testis in not containing fat generally; but in corpulent persons small deposits of adipous matter may be observed in it. It does not communicate with that of the testis, as the fibrous covering of the cord is interposed between them; and it is much less subject than the latter to ananourous actions. Indeed its quantity is proportionally 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 leaves itself more frequently
ly in the form of a single cyl with smooth sides, contained in the cellular substance of the part. The vas, or ductus deferens, is the tube which conveys the semen from the epididymis 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 calibre is so small, the diameter of the part on a section equals a line. The tubuli of its sides are very firm, and cut like cartilage; hence we can distinguish it by the feel from the other component parts of the cord, by folding them between the finger and thumb in the living subject. The intertissue 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 epididymis, ascends behind and a little on the outside of that organ, and then continues its course along the spermatic cord behind the vesicles to the ring. Comprehension of this part occurs the same kind of pain as is experienced when the testes are injured; and the very acute suffering observed on tying the cord in castration, 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 vesicles 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 vesicles. It separates from them behind the opening, and then bends downwards and backwards along the surface of the pons mafeulent, and of the iliac vesicles, to enter the pelvis. Here it becomes attached to the posterior and lateral part of the bladder, and descends obliquely from without inward, 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; it is connected to the surface of the bladder: in this direction it continues along the under surface of the organ, within the vesicae feminales, and connected below by cellular substance to the rectum. In the neighborhood of the prostate, the two vasa deferentia are placed close together, and each units just at the surface of the gland, with the anterior extremity of the vesicae feminales. 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 site 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. The vesicles the bladder it is considerably enlarged again, where it lies along the inner edge of the vesicae feminales. It has here sometimes a slightly serpentine course, and possesses a flattened form. Its cavity is proportionably augmented, and, instead of a cylindrical tube, presents a reticulated texture, like that of the vesicae feminales. Its surface is irregular and tuberculated in consequence of this cellular structure. After receiving the tube of the vesicae feminales, its area 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 neighborhood 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 vesicae feminales in the manner already described. In all cases where there are testicles, that duct conveys the secreted fluid into the urethra, there being no vesicle in form, 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, passes into, and diverges the corresponding vesicles 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 vesicles also diverge the vas deferens, but are more readily admitted into the urethra, as the capacity of that vesicle is not considerable. The vesicae feminales are two soft bodies, resembling, when undisturbed by dissection, membranous tubes with blind extremities, convoluted, and therefore marked with furrows 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 pyriform, with the apex placed forwards, and the base 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 lie 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; in some the anterior and lower end is always small. The flattened appearance of its surface is altered by injection: the whole organ then appears thicker, and the tubercular furrows 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 appendices, 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 appendices; others, particularly near the anterior end of the organ, again branch out. Sometimes the whole vesicula is blind 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 Marco de Toledo, tab. 3*.) This tube, with its appendages, is so convoluted upon itself, the turnings being closely connected together by cellular substance, containing numerous vascular ramifications, that the organ, when modified, is four or five times shorter than the unraveled tube: and a section of it in this state makes it appear to be composed of numerous coils, communicating together. This structure accounts for the knotted appearance of the organ on its surface.

The structure of the vesicula is analogous to that of the ductus deferens: its sides are not so thick, but they are still dense and strong. The external coat is of a close texture, and whitish color, 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 vesicula.

The action of the levatores ani, which has been assigned as the efficient cause of this expulsion, is certainly inadequate to account for it; as their ordinary daily exertion is attended with no such effect, when the vesical 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 evacuation; now the contents of the vesicula must be conveyed into the urethra in the previous moments. The internal surface of the vesicula is formed by a mucous lining, connected closely to the preceding tunic. 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 furrows, not to mention the larger septa formed by the turnings and folds of the tube and its appendices.

It has, moreover, a downy or villous appearance: a similar structure characterizes that enlarged portion of the ductus deferens which lies along the edge of the vesicula. The structure of these parts, as well as the junction of the vesicula and vesicula at an acute angle, has very considerable analogy to the gall-bladder and ductus hepaticus. Both have the same reticulated internal surface; the union of the two tubes, and the supposed 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 vesicula, 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 vesicula and vesicula 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 vesicula at a very acute angle; it is still considerably larger than the latter canal. When the parts are dissected, 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 vesicula and vesicula, proceeds more directly in the course of the latter, lies in close contact with its fellow, passes between the prostate 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 urinary 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 stirits, of which several are seen in the urethra, and sometimes bifid, or even radiated at its extremity. It is called capit gallinnisii, or veru 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 seminal 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 ejaculatory ducts terminated by a common orifice, which is altogether erroneous.

The prostate is a firm glandular body, placed behind the symphysis 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 prostata 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 chestnut. Its broader end is turned towards the bladder, and is divided by a flight 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 pubes, 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 fibres are covered by the anterior fibres of the levator ani. The bafis, or broad posterior part, which is gently concave, embraces the neck of the bladder, and the small anterior ends of the vesiculae seminales and vasa deferentia. The cellular substance, which connects it here to the bladder, is very dense and firm, and the mucular fibres of the organ are partly interwoven with it. This part presents the groove 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 muscular of the perineum, cover the part so 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 intestine covers it in this situation; and it projects feebly into the tube when enlarged.

The urethra, immediately at its origin from the bladder, passes through the prostate from behind forwards, and the membrane is almost conflated with the fides 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 fides. 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
The upper surface, named the dorsum, 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 ferotum; 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 furrow in the ferotum. 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, which is the root of the penis, is divided into three portions, which are distinctly 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. 1. The corpora cavernosa, making up its chief bulk, soft and loose 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 fluids. By thefe the penis is rendered capable of introduction into the female vagina. 2.dly. The urethra, by which the fecundating liquor is conveyed, is a membranous canal, surrounded by vascular subfequence, called corpus spongiosum, which is susceptible of the same change in erection as the corpora cavernosa. 3.dly. The glans is a small organ, consisting of a continuation of the corpus spongiosum, covered by a highly organized and acutely sensible skin, the excitation of which, in the act of coition, determines the discharge of the seminal fluid through the urethra. The penis poifefles an external cutaneous covering, which is simply contiguous to the glans, but united to the corpora cavernosa and urethra by cellular subfequence.

The corpora cavernosae, or corpus 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. These, fixed behind to the rami of the ischia and pubes, advance forwards and inwards, approximating to each other. In front of the symphyses pisiformes they come in contact, or rather, are confounded together in one single body, the size of which is uniform throughout, except in front, where it terminates by a blunter extremity. The separate origin of the two lateral portions has led anatomists in general to speak of the corpora cavernosae in the plural number; but their conformation into one body has induced Sabatier, and some other modern authors, to admit only a single corpus cavernosum, bifurcated behind for a double infection into the pelvis. The single body, formed by the union of the two corpus cavernosae, 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 smaller, and lodges the great veins of the penis; the inferior, broader and deeper, receives the urethra, to which it is united.
united by a close cellular substance. The sides of the body are rounded and covered by the skin, its anterior extremity forms a blunt point, received into a cavity, at the base of the glans. The two parts are united by a very dense cellular substance, and some blood-vessels pass between them, but there is no other kind of communication; and air or injection, thrown into the cellular substance of the corpus cavernosum, do not find their way into the glans. The latter, therefore, is not an expansion or continuation of the former, as some old anatomists supposed. The posterior extremity is bifurcated, and its two prolongations form the two crura penis already mentioned. These begin in a pointed form a little above the tuberocities of the ischia, from the inner surface of the bone, to which they are attached as far as the symphyses. Below and within they are covered by the erecitors and accelerator muscles, above and without they adhere strongly to the bone. They leave between them a triangular space, filled by fat, and by the urethra, which occupies its middle. Three parts are to be considered in the corpus cavernosum, viz., an external membrane, a peculiar spongy substance, and a longitudinal septum, occupying its middle. The outer membrane is of a fibrous nature, very thick and firm, whitish in its colour, and hallowing on the body its peculiar figure. Its external surface is covered with a dense cellular tissue: on the inside it adheres closely to the spongy substance. Thinner on the crura, in the groove lodging the urethra, and at the anterior extremity, it presents in these situations a livid tint, produced by the contained blood, while it is thicker every where else, whitish, and opaque. In the former situations there are some perforations for the admission of blood-vessels. It is continuous and strongly interwoven with the periura of the orifice, and passes through the middle of the characters belonging to fibrous organs, and is made up of fibres variously interlaced, and forming several strata. It is found to be very hard and resistible, when exposed to the action of a cutting instrument. It experiences a passive dilatation from the influx of blood in erection, and returns to its former state, when this extension goes off. It does not seem to possess any vital properties.

The spongy matter of the corpus cavernosum is a cellular substance, composed of very fine and numerous plates and fibres detached from the internal surface of the fibrous membrane, and disseminating each other in every direction. Its cells are all communicated together, and are more or less filled with blood, which can be removed by forcible squeezing, or repeated washings. Various fibrous threads cross the cellular substance in different situations, and are attached to the surface of the fibrous membrane. They are said to prevent excessive dilatation of the corpora cavernosa. An artery and a vein pass through the centre of the cellular substance on each side, from behind forwards. Their minute ramifications must, undoubtedly, communicate with the cells of the organ, since injection will pass from the arteries into these cells; and injected fluids or air, after filling the corpus cavernosum, gain admission into the veins. The blood contained in the corpus cavernosum has always a dark livid appearance in the dead body; but it is red during life, as may be seen in amputation of the penis, or in living animals. Its quantity varies very considerably, according to the condition of the penis; at rest it is inconsiderable, the whole corpus cavernosum is dilated; from the bent position to the glans, it is elongated and hardened, and erection is produced.

The septum of the penis divides it longitudinally into two portions, which most anatomists consider as distinct tubes, under the name of corpora cavernosa. In order to see if well, the fibrous membrane should be cut through on each 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 plate, but leaving intervals between them, at which the two sides of the corpus cavernosum communicate freely. From this structure the name of septum pectiniforme 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 crura meet together, the septum is complete, it degenerates into separate valvulae towards the opposite end of the organ, and the intervals between them are more considerable, as we approach nearer to the front extremity.

The dimensions of the penis are determined in great measure 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 crura penis gives attachment at its origin to a tolerably strong muscle, named the crurum penis, probably, because when a power, capable of producing the effect indicated 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 question obviously draw the penis downwards and backwards, instead of upwards and against the pubes. Those who explain 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 tenacious origin, below the attachment of the crura penis, from the inner surface of the tuberocity, and ramus of the ischium. It passes forwards, upwards, and a little inwards, and is firmly implanted in the fibrous membrane of the crura penis. It will draw the corpus cavernosum downwards, for as to bring it more nearly into a direction parallel to the cavity of the vagina: it has a slight power of shortening the crura 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 urinary 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 prostatic ducts open into it; it is closely connected to the corpus cavernosum, and terminated by the glans. In the male subject it forms a canal extended from the neck of the bladder to the end of the penis, and giving passage to the urine and semen. 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 prostate, passing forwards and downwards: it goes under the symphyses 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 become 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 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 prolate to the bulb, is called the membranous portion; the latter corresponds above to the inferior surface of the lymphatic pubis, but is about half or three quarters of an inch below the bone. Below it is connected by cellular 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 notion 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 mucilaginous fibres. The mott interior of these are circular, and lie close upon the membrane of the urethra. Mr. Wilton has lately described some fibres, arising by a double tendon from the arch of the pubis, depending on each side of the urethra, and united under the canal. (See the Medico-Chirurgical Transactions, vol. 1.) These fibres are connected in front with the accelerator urethra and its vessels, and behind with the levatores ani. They will compress the canal when they contract, and, by doing 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 oval 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 urethra (see Accelerator), and by Cowper’s glands. Together with the two preceding parts of the canal, the bulb forms the first curve of the urethra, and its sides are strongly connected to the arch of the pubis by means of a fibrous expansion, termed the triangular ligament of the urethra. The latter part passes the figure, which its name indicates; the base of the triangle is turned downwards, the apex upwards, corresponding to the junction of the os pubis, and the sides are attached to the rami of the pubis. 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 corpus, 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 prolate, and smaller where it enters and leaves the gland. The canal is here rather flattened laterally. In the membranous portion it is perfectly cylindrical, but small in its size; and the narrowest part 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, preserves 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 filing it with wax, and measuring the calt thus formed. The length was nine inches; from the external orifice to the bulb, seven. The membranous portion was 39 inches in length, and the prostatic part of the canal half an inch. The diameter of the calt, at 8 of an inch from the external orifice, was 9-20ths of an inch in a subject of 30 years, and 9-20ths in one of 30 years; at 4 in inches from the external orifice 7-20ths; at the bulb of the urethra 12-20ths; in the membranous part, immediately adjoining the bulb, 7-20ths; in the middle of the prolate 11-20ths; at the neck of the bladder 9-20ths. Home on Strictures, vol. i. p. 29, and 25.

The situation of the eminence, on which the ejaculatory ducts open, called the verumontanum, in the prostatic part of the urethra, and its figure, have been already noticed; as well as the openings of the ejaculatory 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 so very closely to the mucous membrane, keeps it constantly smooth. Hence the diameter of these parts is nearly uniform at all times. The fides 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 lacunæ; their number and size vary in different subjects. They run from behind forwards, and terminate by simple orifice. They are almost always accompanied by the folds 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 sides 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 discerned connected with them. In these tubes the mucous fluid is secreted, by which the surface of the urethra is smeared, and defended from the action of the urine. Where these lacunæ do not exist, as in the bulb, membranous portion and prostate, a protecting fluid is furnished from other sources, as Cowper’s glands and the prostrate. The fluid of the lacunæ seems to be a clear, viscid secretion, similar in appearance and consistency 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 leucorrhœa, 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 prostrate, so intimately connected with the canal, gives it to a strength and thickness in this part. The membranous portion is differently circumstanced; this is the thinnest, and least firmly supported division of 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 prostrate, and by the mucilaginous 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 spongiosum urethrae, or corpus cavernosum. It begins in front of the membranous part of the canal, by a large protuberance already mentioned, as the bulb of the urethra. It forms an oblong rather elongated production, hanging between the crura.
crura penis and below the canal of the urethra, sometimes bearing a slight appearance of division into two lateral parts by a middle line, and terminating behind by a rounded point. The bulb corresponds only to the inferior surface of the urethra; but a thinner layer of the corpus spongiosum, continued from the bulb, covers the urethra on all sides in front of that body to the end of the prepuce. Here it is again increased in quantity, and reflected over the anterior extremity of the corpus cavernosum penis, to form the glans. The spongy substance surrounds the urethra uniformly on all sides. It is closely connected to the corpus cavernosum above by cellular substance, and by vesicles 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 network, the cells of which contain venous blood. The texture of the external layer occasions the parts to possess a livid colour, as the tint of the blood is discernible. This network 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 confine, 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 dilatation, as the spongy substance of the corpora cavernosum 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 lending prolongations into the mucous sinuses 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 fossa 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-veffels. 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 seen 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 excites the force of habit in blunting such feelings. The first time of pulling a bladder from before backwards is sometimes attended with exquisite, 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 acutely painful when the membrane is inflamed. It has been much disputed whether or no this canal possess a contractile power in its own lining. 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 disease, and the sudden cessation of this inconvenience, can hardly be explained without allowing a contractile force to the membrane. The expulsion of instruments from the canal is another phenomenon of the same kind. That the urethra is extensible, and that it returns again to its original size, is proved by the passage of instruments. Haller states that chemical inflammants 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 trifling degree. It has the form of a cone, slightly flattened from before backwards, with its base very obliquely truncated. Its apex presents the aperture of the urethra already described. Below this, is placed the frenum connecting it to the prepuce; and on each side of this fold it swells into a small convex protruberance (callus glandis). This part is called by Haller 'fundi acerrimi fide.' The glans cannot be laid to extend below the urethra, as that part belongs to the corpus spongiosum. Since the bafs is to obliquely truncated, the depth of the organ is very inconsiderable 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 riving 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 riving externally, forms the front boundary of a cupola, 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 corneal glands are continuous below with the corpus spongiosum; the bafs 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 urethra 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 bafs 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 preceles, which are more 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 vast numbers over the whole surface, giving it an irregularity in its appearance. This circumstance in the structure of the glans was first demonstrated by Albimus (Annot. Academ. lib. iii.), and is admitted by Ruyfch and Winlow, although
although some anatomists have questioned it, probably because the demonstration is rather difficult. That the nerves of the organ are continued into these papillae, as they are in the tongue, and that the exquisite sensibility of the glans arises from this organization, is rather matter of probable conjecture, than the result of direct proof. The blood-vessels of this cutaneous production are numerous, so that a general redness is produced by minute injections. The opposed surfaces of the glans and prepuce are smeared over with a white, friable, and mucous sub stance, of a very peculiar odour, moistening the parts and preventing the effects which might otherwise follow their mutual attrition. In animals there are manifold glands to secrete this substance, and an apparatus of glandular structure defined to the same office has been described in man. This kind of sebaceous matter is formed in other situations of the body by peculiar glandular organs, as in the eye-lids by the Meibomian glands; and the notion that it is deposited by the urine, which is contrary 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 preputium clitoris of 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 glandulae odoriferae. Morgagni, in his Adversaria, has given a very particular description of them, and Haller confirms his statements. They are hardish, white, and very small bodies, particularly observable 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 would 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 asserted by competent witnesses. They may be rendered more evident when enlarged in dissection; and might be mistaken for venereal pimpls, 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 substance, where the necessary attentions to personal cleanliness are neglected, and that in hot weather, it may become acrid and irritating, so as to produce excoriations and even ulceration, are well known facts. The inhabitants of warm climates are chiefly exposed to these inconveniences, and the most important advantage of circumcision consists in its obviating such accumulations. Hence we know that Christian, living under the burning sun of Senegambia, submit to this operation, and that uncircumcised Europeans, living in the East, very frequently experience the ill effects arising from the foreskin just alluded to. For this reason Guido de Caulacico, a celebrated furgon of his time, about the middle of the fourteenth century, observed that circumcision was useful to many others besides Jews and Saracen: “propriae quod non congregantur fordities in radio balani et calcisulento ifum.” Chirurgia, an. vi. doct. ii. p. m. iii.

The glans penis possesses a very exquisite sensibility, particularly in perine, where it is habitually covered by the prepuce; 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 scrotum and pubes, and at the other with the prepuce. It is thin, furnished with numerous sebaceous glands, particularly at the under surface, and marked in that situation by a rough line, called the raphé, running along the middle of the organ, and continued with a similar one on the scrotum. It is darker coloured than the integuments 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 far 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 collapsed state, and extended more smoothly in the erected condition. It is continuous with the cellular substance of the scrotum, groins, 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 when inflated, a cottony appearance. The suspensory ligament of the penis is placed at the root of the organ, which it unites to the lymphatic pubis. It consists of a dense, cellular, elongated, and flattened band, proceeding from the front of the lymphatic pubis, running along the cellular tisue of the organ, and expanded under the skin. Its limits and figure are not very determined, and the knife of the dissectors 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 or less 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 external 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 thicker to the touch, is in contact with the glans, to which it has a membraneous 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 retraction 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, if the prepuce be moved forcibly in this direction, it may even be torn, as in coition: this accident is particularly likely to occur, if the shortness of the fold allows only a partial exposure of the glans. Such a disposition of parts rendering the act of copulation painful, might require a portion of the frenum. The basis 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 retraction of the organ, and even to obstruct the flow of urine; this constitutes phymosis: in others, it can be withdrawn, but the tightness is so great that it may not be possible to restore it; that is termed paraphymosis. It has been affected of 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 glandulae odoriferae; so that circumcision has been more especially necessary on that account. 

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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 basis 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 possess 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 cease to be diminished.

The arteries of the male generative organs are chiefly furnished by the trunk of the pudendal; but the prostate and vesical feminales receive branches also from the vesical arteries. The integuments of the external parts have branches from the perineal artery, and from the vessels 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 meieenteric. 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 size, and are derived principally from the 2d, 3d, and 4th facial pairs.

Develoqement 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 processes of nutrition is carried on in them with great activity. But they may be observed at an early period in the fetus, where, without having any remarkable predominance over other parts, they are considerably advanced, as if nature, in sketching out the organization, had wished to mark distinctly the dilating and factional traits.

In the adult state, we shall describe merely the condition of the testes and seminal cord, as these are the only parts differing essentially at that time from the state in which they are found in the newly born child. The cells 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 intesines, passes in the advanced periods of utero-gestation into the scrotum, 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 mammalia have both testicles in the scrotum. This remarkable change was first noticed and described about the middle of the last century, when many celebrated anatomists turned their attention to it, inasmuch that it is difficult to determine with whom the credit of being the first describer falls. 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 seats 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 fate of parts favouring 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.

Renaulde de la Car Une, a French surgeon, who wrote a treatise on ruptures in 1726, has the first hint on the subject; he speaks of the intesines and omentum escaping through the same canal at which the testis has passed out. Among the numerous claims, which the great Swiss physiologist potatoes, 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 Car Une is a single and indirect hint, we must assign the honour of the discovery entirely to Haller. (See Commerc. litterar. Norimargar, 1735, p. 197; 1737, p. 3. Programm um, hermitum observationes aliquot. Goetting, 1739. Opuscula pathologica, Laufanne, 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 testes lying in the abdomen in a still-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 accurate account of the original situation, and of its change in the testes. (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 new born children, and sometimes met with in adults, London, 1765. Treatise on the Hydrocele, lect. 3. p. 12. Chirurgical observations and cases relative to ruptures, lect. 2.) Camper, who waited so successfully and peculiarly in surgical pursuits, investigated this matter with considerable attention, and gave the results of his labours to the public in the Harnens Transact. v. 6 and 7. The works of Neubaur and Lobelias must not be omitted in this enumeration; that of the former is entitled, "De tunica vaginalis testis et funiculorum histrici." Giese, 1767. The dissection of the latter, "De hernia congenita, instituta in corporum testis eft," Argentorat 1771, contains a very excellent and complete account of the whole matter, both in an anatomical...
cal 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 adjuncta tabulis polihumis Santorini. Palletta nova gubernacula testis Hunteriani et tunica vaginalis anatomiae descrip- 


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 infant, lies before the bladder and urethra, as well as before the facium. Indeed the face 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 ligamentum of the colon, part of the rectum, the greater 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 womb 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 loins, its position may vary a little. The most natural forms to be when the anterior edge is turned directly forwards; but the leaf 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 all 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 envelops 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-vessels, like those of most parts of the body, commonly arise from the nearest large trunks; viz. from the aorta and cava, or from the umbilicus. The nerves too come from the nearest source; that is, from the abdominal plexuses of the intercoidal. In respect, therefore, to its supply of nerves and of vessels, this organ may be reckoned an abdominal viscus; and this circumstance of its peculiar situation before birth accounts for its being supplied afterwards from some remote 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 downwards from the lower end of that organ, behind the upper extremity of the gubernaculum, which we shall describe presently; then it goes over the iliac vessels, and the inside of the psoas muscle, somewhat higher than in the adult, and passes afterwards, in the direction already described, along the bladder. The cremaster muscle turns upwards, instead of descending over the pubes, and seems to be lost on the peritoneum near to the testis.
down towards the scrotum: but when the latter and the ligament are drawn downwards, then there is an aperture from the cavity of the abdomen all round the fore-part of the ligament, apparently ready to receive the testis. This aperture becomes larger when the testis descends lower, as if the pyramidal ligament was first drawn down, in order not only to direct, but to make room for the testis, which must follow it. The aperture is sometimes so large that the testis can be pushed into it, as far as the tendon of the external oblique muscle.

From this original situation in the abdomen, the testis moves downwards, at a certain period, to its defined situation in the scrotum. Its lower extremity comes into contact with the lower part of the abdominal parietes. At this time, the upper part of the ligament, which hitherto was in the abdomen, has sunk downwards, and lies in the pannus from the abdomen to the scrotum, which is afterwards to receive the testis. As the latter pusses out, it inverts the gubernaculum, going down behind it: what was the anterior surface of that organ now becomes posterior, and compasses the lower and anterior portion of the tunica vaginalis. Mr. Hunter states, that the place where the ligament is most confined, and where the testis meets with most obstruction in its descent, is the ring in the tendon of the external oblique muscle; and, consequently, that where the testis are not in the scrotum, they are more frequently lodged immediately within the tendon of that muscle, than included in the cavity of the abdomen. The testes commonly remain for some time by the side of the penis, and descends only by degrees to the bottom of the scrotum. When it has entirely descended, the ligament is no longer visible.

While the testis is descending, and even when it has pased into the scrotum, it is still covered by the peritoneum, and is connected by its posterior edge exactly in the same manner as when it was within the abdomen. The spermatic vessels run in the same way behind the membrane, the testis is fixed backwards to the parts against which it rests, and is unconnected and loose forwards, as it was when in the abdomen. In its descent the testis brings the peritoneum with it; but the elongation of that membrane, though it resembles, in some circumstances, a common hernial sac, in others is very different. If a person can represent to himself a hernial sac reaching to the bottom of the scrotum, and covered by the cremaster; if he can imagine, further, that the posterior half of the bag covers, and is united with the testis, epididymis, spermatic vessels, and vas deferens, while its anterior half lies loose before all those parts, he will have a perfect idea of the state of the peritoneum and of the testis when it first descends into the scrotum. This gland, therefore, does not fall loose, like the parts protruded in a rupture, into the elongation of the peritoneum; but it slides down from the loins, carrying the peritoneum with it, and both continue to adhere, by cellular membrane, to the parts behind them, as they did in the loins. The ductility of the peritoneum, and the looseness of its connection to the parts surrounding the testis, are circumstances which favour its elongation and descent into the scrotum with the testis.

It is plain, from this description, that the cavity of the bag, or elongation of the peritoneum, which contains the testis in the scrotum, must at first communicate with the general cavity of the abdomen, by an aperture at the abdominal ring. That aperture has exactly the appearance of a common hernial sac: the spermatic vessels and vas deferens lie immediately behind it, and a probe passes readily through it from the general cavity of the abdomen down to the bottom of the scrotum. And if this process of the peritoneum be laid open through its whole length on the fore-part, 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 gubernaculum downwards, the peritoneum is carried with it to 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 substance.

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, descending 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 full term. The process of contraction is continued downwards, along the cord, to the upper end of the testis, at which it stops. Thus the tunica vaginalis testis, which was in the first influence 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 ready 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 an union of the parts is much greater; as in children who have had the sac kept open by a turn of the intestine falling down into the scrotum immediately after the testis. "The closing of the mouth, and of the neck of the sac, is peculiar to the human species; and we must suppose the final 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 supposed cause has existed. Is the testis pulled down by the cremaster muscle? I can hardly suppose that it is. Because, if that was the case, I see no reason why it should not take place in the hodge-podge, as well as in other quadrupeds; and if the muscle testis had this power, it could not bring it lower than the ring of the muscle."

The process, 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
GERATION.

nalis communicates permanently with the abdomen, as in quads pedes. Hence, we sometimes see hydroceles particularly in children, where the fluid can be made to pass into the belly by pressure. If a rupture occurs in such individuals, it is contained, together with the testicles, 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 remain 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 through life 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 of the case and other symptoms strongly circumstantial circumstances 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 an angle behind the sac of the hernia, 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 understood, 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 Wriiberg 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 smallest possible interval; the ferotum loose and defective. At two months, the testes, exceedingly small, touched the umbilicus; the gubernaculum long; no canal passing through the ring, which was perfectly closed. Four months and two weeks, the testes near the ring, with a canal of peritoneum on each side, passing to the bottom of the ferotum. 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, ferotum 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 full open; but the left could not, as the communication was already closed. Nine months, testes in the bottom of the ferotum; the canal of communication perfectly closed on the left side; it was shut on the right by a solid cellular substance easily yielding to the probe. Nine months, both canals perfectly closed."

From the foregoing facts, the following conclusions may be drawn: 11. 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 seventh month, they are generally found about the ring; being in some instances above it, in some within the canal, and in others just below it. 3dly. The ferotum in the first months, up to the fifth, is small in proportion to the body; sometimes loose, sometimes harder, but always containing cellular substance instead of the cavity, in which the testis is to be afterwards lodged. A broad and strong falciform ligament is contained in the midid of its cellular substance. 4thly. When the testes have first descended into the ferotum, the canal of peritoneum still opens to the abdomen, so that they can be easily drawn back into the belly, and link 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 uterine gestation, has both testicles in the ferotum. Haller's contrary statement, "ut rarius fetus in lucem edatur, cum testiculis feroto inclivi." (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 Wriiberg, with whom Vieq d'Azyr agrees, this is commonly the case. But the representation of Camp is somewhat different: this anatomist and Lobstein observe, that the obliteration takes place earlier on the left than on the right side. Of 53 newly born children examined by Camp, 23 had the canal open on both sides, 11 on the right side only, and 9 on the left only. In 4 cases, the canal was closed on both sides. In these last cases, both testicles were contained in the abdomen; and in three only on the right.

In the excellent memoir of Wriiberg, 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 49; or in round numbers 1 to 10. 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 ferotum, three in the groin, and three in the abdomen of the children born towards the end of the ninth month, 69 had both testes in the ferotum, 17 one or both in the groin, eight one in the abdomen, and three, whose weights were 5½, 6½, and 7½ lbs., both in the abdomen. In the 12 out of the 103 cases, where one or both testes remained in the abdomen, they were observed to descend on the days mentioned below.
in infancy it passed down on the day of birth; the deficient 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-first. 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 deficient was not known. In three instances, the deficient was observed to be accompanied with crying and convulsive motions of the limbs. Both tests had passed into the ferument of one child, born at the end of seven months, and weighing only 3½ lbs.; which must be deemed a rare occurrence. They have been seen in the ring in a fetus of four months. Bichat, Anat. Defer. 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 confidence of the testis at this time is soft and pulpy.

The penis, at the time of birth, although small, is well formed, and poises an elongated prepuce, which completely covers the glans. The integuments of the penis, as well as those of the ferument, are not distinguished in colour from those of the body in general. The rugae of the ferument are not yet well marked. There is a small quantity of fat in the ferument, and the fibrous covering, common to the cord and testes, cannot yet be distinguished. The vesicule feminile, 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 sub stance, and the trifling quantity of blood which it contains. The latter circumstance is less 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 excitation, 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 symphyse pubis is more oblique than in the adult. These two circumstances, in the conformation of the urinary canal, arise from the bladder being situated higher in the abdomen, and from the superior aperture of the pelvis being more flattened. The prepuce 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. Filled 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 forms, if we may use the expression, to forget the instruments of reproduction, which continue for a time stationary. If, during this long period, the organs undergo no important revolution, they partake chiefly 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 pubes is covered by a flight down, which appears generally before the beard. We may remark also, that its appearance is more gradual, 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 the same time that the hairs appear, the skin of the ferument and penis loses its whiteness, and becomes more or less brown in conformity with the tint which it poises in other parts of the body. The ferument, hitherto contracted, becomes longer; the testicle is removed to a greater distance from the ring, and the spheric 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 ferument are complete at this time. The testis is proportionally larger than the vesicule feminiles and penis, as the exercise of the generative functions commences here. The vesicule feminiles 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 ferument is generally soft and pendent, and external impressions are no longer able to bring it into the state of corrugation. The cellular substance which it contains is frequently the seat of watery effusion. The fibrous covering of the testicles and cord is dense, thick, and easily demaniflurable. The testicle is small, soft, and waffled; but without any remarkable change in its organization: the volume of the epididymis, on the contrary, is equal to what it possessed in the adult. The spheric cord is rather smaller, unless the veins should be in a dilated state. The vesicule feminiles are collapsed, and the proflrate becomes hard; the penis is constantly placid.

Physiology of the male Organs of Generation.—We shall describe, in the first place, the fecundating 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 aforcinmed concerning this interesting subject, just as we treat any other part of physiology: we must 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 vesical 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 coagulated milk. It is of a viscid or glutinous nature, and therefore readily entangles air; hence it becomes frothy if rubbed in a mortar. When inr dischaged, its consistence is about equal to that of a thick cream; but as it cools, the opaque maculaginous part becomes transparent, and acquires greater confluence. In about twenty minutes after its emission the whole becomes liquid; at this time, too, it is transparent, having deposited a sediment of a whiffet matter, resembling a mass of flander rag. The liquefaction is not owing to the abstraction of moisture from the air, for it loses instead of acquiring weight during its exposure to the atmosphere;
The seminal 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 testis: 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 , a 4'-th of an inch. They are found in all quadrupeds, in reptiles, birds, fishes, insects, and even in tefaceous 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 males, so that their presence may perhaps be deemed a criterion of the maturity and perfecfness of that fluid. The seminal vermiculi were first observed by a German youth, Lewis Hanne. He saw living animals in the human semen 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 shown 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 Hartsoocker claimed the discovery, but not till the year 1678. (Essais de Dieprique, p. 227.)

It has been alleged that these animalcula are not peculiar to the semen, but that they are found in various other animal fluids. Accurate investigation has not substantiated this objection; but, on the contrary, shews that they are peculiar to the seminal 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. 175 & seq.; his representations being supported by those of Turberville Needham. (Nouvelles Observations Microcopiques, p. 213.) M. De Buffon observed the fluid from the seminal vesicles of a dead human body yet warm. It was full of filaments moving about, and branching into many parts. The filaments swelling burlly, and many oval corpora amylacea escaped, which still remained attached to the filament, as by a thread: then they oscillated like a pendulum, and during those oscillations they were extended. The corpora amylacea, at length detached from the filaments, traversed the most fluid part of the semen, along with their filaments, the extreme length of which impeded their motions, and they seemed to him to endeavour to free themselves from it. Having diluted the semen with rain water, the microscopic view was better defined. It clearly appeared that each oval corporula had a double motion of oscillation, and of progression. In two or three hours the seminal matter acquired greater fluidity, the filaments disappeared; the number of corporula increased; the threads contracted; the oscillations relaxed; and the progressive motion increased. In five or six hours the oval corporula, having loit the threads, resembled animals more than ever; not only because their quivers in humming was greater, but because they directed their course to every quarter. In twelve hours the activity of the corporula was great; and some revolved upon their axis; others changed the oval to the globular figure under the observer's eye; some divided asunder, to that one formed.

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nor is it owing to the action of the air, for it takes place equally in close vessels. It has been observed that the thick flaky portion is thrown out first; while the thinner part comes after. It is heavier than any animal fluid, and sinks immediately in water: but a part swims, consisting of white shining filaments, forming a cobweb-like texture, and composing small floating masses. That which sinks in the mucous or pulpy portion, which is the greater part of the whole; but of this little membraneous-like flakes are sometimes suspended by air bubbles. These sink to the bottom and disappear on the second day, but the water remains turbid, and contains fiocculi and white shining threads. Its odorous properties are very sensible; not irritating but mawkish and unpleasant, like the farina of the Spanish chef-nut. In animals it is said to be of a more penetrating nature; so that when absorbed it infects the whole body, and renders the flesh unfit for eating, unless the testes are cut out immediately after the animal's death. (See Buffon, t. 5. p. 121, of the boa.) The taffe is at first infipid; yet there is somewhat of pungency in it, which after some time stimulates and excites a degree of warmth in the mouth.

It converts paper stained with the blossions of mallows or violets to a green colour, and consequently contains an alkali. It diffuses readily in water, after its spontaneous liquefaction: alcohol or oxymuriatic acid precipitates white flakes from this solution. Acids readily diffuse the femen, and alkalies do not decompose this solution. Lime engages no ammonia from fresh semen; but after that fluid has remained for some time in a moist and warm atmosphere, lime separates a great quantity from it. Consequently ammonia is formed during the exposure of semen to the air. When oxymuriatic acid is poured into semen, a number of white flakes precipitate, and the acid loses its peculiar odour. These flakes are insoluble in water, and even in acids. If the quantity of acid be sufficient, the semen acquires a yellow colour. Thus it appears that semen contains a mucilaginous substance analogous to that of the tears, which is engendered by absorbing oxygen. Vauquelin obtained six parts of this mucilage from 100 parts of oxygen. When exposed to the air at the temperature of 60°, a pellicle forms gradually, and in three or four days small transparent crystals of phosphatw of lime are formed. Afterwards small round masses of the same substance are observed in the pellicle. If the air is moist, crystals of carbonate of soda may be formed. The evaporation does not go on to complete evaporation, unless in a temperature of 77° with dry air. When all the moisture is evaporated, the semen has lost 0.9 of its weight; the residuum is semi-transparent like horn, and brittle. When kept in moist air, at the temperature of 77°, it acquires a yellow colour, acid taint, and putrid odour. Exposed to heat, it becomes brown, and exhalates a yellow fume, having the odour of burnt horn. When the heat is raised the matter softens, becomes black, and gives out a strong odour of ammonia. When the odour of ammonia disappears, if the semen be lixiviated with water, an alkaline solution may be obtained, which, by evaporation, yields crystals of carbonate of soda. If the residuum be incinerated, there will remain only a quantity of white ashes, consisting of phosphate of lime. Thus it appears that semen is composed of the following ingredients:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>Water</td>
<td>900</td>
</tr>
<tr>
<td>Mucilage</td>
<td>6</td>
</tr>
<tr>
<td>Phosphate of lime</td>
<td>3</td>
</tr>
<tr>
<td>Soda</td>
<td>1</td>
</tr>
</tbody>
</table>

100
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 ameliorous, the ovular corpuscula did not proceed from the filaments; but those, dividing in two, were metamorphosed into corpuscula. They were embrittled 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 infusions. 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 lie forms of them a particular class, under the term of *organic molecules*, which are particles disfigured 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 feminal vermiculi; for the latter live at most only for a few hours after the discharge of the fluid, while these observed by him remained for some days. And his remarks on the whole seem much more applicable to the microscopic animalcula observed in vegetable infusions, 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 set the whole history of the spermatic animalcula in clear light; that no doubt can remain on the subject. The general result of his researches tends completely to confirm the original remarks of Leeuwenhoek. (See his Treatise on the Nature of Animals and Vegetables, Edinb. 8vo. 1799.) He observes that his experiments on fresh human femen 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 supposing 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 injured, does not give evidence to a particular kind of animalcula. They are produced differently, 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 fermen for this purpose; but it was most probable, that the putrefaction of this liquid would give evidence to particular beings. May not M. de Buffon have confounded these with the feminal vermiculi, and ascribed to the latter those properties and phenomena exhibited by the former? I determined to ascertain this fact by observing what happened successively to the fermen, when long preserved in a watch-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 hectic and disagreeable odour; but I could perceive no animal 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 equalizing that of spermatic vermiculi; but they had no tail, and greatly resembled molt minute spherules. Like animalcula of infusions, they sometimes flopped at little fragments of corrupted fermen; sometimes their course was very rapid, retrograde, rising and sinking in the liquid; in a word, they performed every property of infusion animalcula. They were seen in every stratum of the fermen; and those at the bottom put in motion the dead bodies of the feminal vermiculi, which were full entire, and remained fome days longer." Two or three successive generations of these animals were observed, as in the case of other animalcula. When the fermen was exposed to a greater degree of heat, they appeared at a more early period, even as soon as twenty-three hours from the removal of the fluid from 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 spermatic 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 deflagraged 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 vermiculi, 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 fermen." p. 135-142. The following account of the spermatic vermiculi is taken from the work of Spallanzani already quoted, which contains the most complete account of the subject.

When the femen begins to dissolve, if it be examined with a magnifier of small power, the irregular parts seem to be in an indistinct fluid agitation, produced by globular corpuscula, of which each poffesses a form 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 versa, in which the appendage is curved from one side to the other; the other is progressive, the vermiculus transporting itself by oscillation. They strike against every obstacle, and when in considerable numbers, make a thousand contortions to escape, 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 progression had diminished; and in an hour and a half it had lessened so much, that a very small number of corpuscula possessed any power of motion. In general, the progressive motion ceases before the oscillatory; so that, at last, the corpuscula 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 corpuscula remain entire in the fluid, and then they are better seen than even when the liquid is diluted with water. Each corpusule 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 observed, 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 61° they lived for seven or eight hours. The spermatica were seen in the fluid obtained from the epididymis and deferens of various living and recently dead animals. That they are not formed, according to the sentiment of Buffon, from the filamentous part of the fermen, is proved by this; that they are molt 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 affected, by exposure to air. For Spallanzani saw them in the usual numbers, when the time employed in taking the fluid matter from the seminal vessels still 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 delay from the epididymis of a living ram to the microscope.

Great care and attention are necessary in oberving 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 very 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 continuall agitation. With the blow-pipe I formed capillary tubes; one end of which I immersed in recent semen; it ascended the cavity, filling the tube to a certain height. Breaking the tubes near the part to which it ascended, I prevented 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 spermatica 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 rept. All, or at least most of them, had a singular mode of moving. Some had that sort of activity observed in thefey, 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, and, after resting 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. These 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 four 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 years. P. 158.

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

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

To this account of the feminal vermiculi we subjoin the following reflections on them by Bonnet, observing only that we are in a state of the most profound ignorance of all the points alluded to in his queries.

"The vermiculi are, of all the animaeula 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 fingular 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 vessels, 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 Tracts, p. 179. The reader may also consult, on this subject, W. F. von Gleichen über die Saumen-unck infusions-thierchen, Norimb. 1778, 4to.

The opinions of Leeuwenhoeck concerning these vermiculi; viz. 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 chimerial.

We have no accurate accounts of the sensible properties, nor any chemical history of the fluid separated in the testes. When observed in the vas defecres or epididymis of man, after death, it poisons a light-brown or yellowish colour, and approaches in fluidity to water. It may be seen in animals, on cutting into the testis 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 tinged with this fluid. The contents of the vescicle feminales differ in their appearance from the secretion of the testes. It is a brownish or yellowish fluid of light colour, semi-transparent, and often containing flakes or coagula, so as to vary in consistence in different parts of the bag. Expose 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 vescicle was of a lighter colour than is usually found in men who have been dead a considerable time; but it was not any means like the semen either in colour or smell. In the other the contents of the vescicles were of a lightish whey colour, having nothing of the smell of semen; and in this fluid a flat, as to run out on cutting into them. Ob. on the animal Economy, p. 289. Thus it appears that the fluid of these bags differs both from that contained in the testis, and from the semen emitted in coition; consequently, that they are not merely reserves for the matters separated in the testis, but that they add to the secretion 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 allign a similar function to the enlarged portion of the vas deferens lying by the side of the vescicle feminales. The exact nature of the fluid separated in the vescicle
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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 consist chiefly of their own secretions.

The opinion, that the vesicles perform a particular secretion, was held by Haller: "I have," says he, "no experiments of my own to prove that any thing is separated in these organs, and mixed with the fluid formed in the testes. I suspect, however, that a secretion takes place here in the gall-bladder." (Elem. Physiol. 7. p. 542.)

Galen conceived that the semen was generated in these parts; and Riolan, Rayuch, 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 "On Observations on the Glands situated between the Rectum and Bladder, and called Vesicles feminales." His chief argument is derived from the examination of the organs in persons who have lost one of the testes 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 normal appetites and the faculty of procreation. We may consequently premise that they have afterwards had connexion with women, and consequently had the action of emission, which must have emptied the vesicle 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 testis.

Such cases also afford an opportunity of making comparative observations between the vesicle 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 connexion with woman after that period. I inspected 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, with the penis and urethra, I found that the vesicula deferentis 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 membrae surrounding the duct on the right side was not so loose as on the left; neither were the vesicles which ramified on the right vesica fo full of blood. But upon opening the vesicles, both appeared to be filled with a kind of mucus similar to that which is found in other dead bodies; and the vesicle on the right side was rather larger than that on the left. Whatever, therefore, may be the real use of these vesicles, we have a proof from this direction, 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 bubonoele, the testicle of that side was discovered to have almost lost its natural texture from the pressure of the bursa; and upon examining the testicle with attention, there was no appearance of vesicles till we came near the bladder, where it was almost as large as usual. The vesicle of that side was found to be as full as the other, and to contain the same kind of mucus.

"I extinguished the left testicle of a Frenchman on account of its being diseased. 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 vesicle were both found nearly full; more especially that of the left side, which I suppose might be accidental. But upon examining the vesicles of the left side, where it lies along the side of this bag, and where it has a similar structure with the vesicle, 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 diseased in his left testicle, had it removed, at St. George's hospital, by Mr. Walker, in August 1755; 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 inspected, with a view to discover the cause of his death, and upon an examination of the vesicles, 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 diseased 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 pelvis, where the internal iliac vessels divide above the angle of reflection of the peritoneum at the union of the bladder and rectum. The left vesicula deferentis 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 vesicula deferentis 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 seminal cord from this point to the testicle, I could discover no vesicula deferentis, 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 straight, 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, so that a portion of the epididymis was wanting; and the vesicula deferentis for nearly the whole length of the seminal cord of the right side. On the left side the vesicula deferentis began, where the epididymis commonly terminates; and there was a deficiency of nearly an inch of the extremity of the duct. I then dissected the bag above-mentioned, which proved to be the two vesicula; for by blowing air from one vesicula I could only inflate half of it; and from the other vesicula, 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 prostate gland, nor any remains of one. In this subject it was evident that there was no communication between the vesicula deferentis and epididymis; nor between these bags and the urethra. The caput gallinae had the common appearance, but there were no orifices to be seen. The testicles were very full; and the ducts from them to the epididymis were very manifest, and full of semen." P. 30—32.

Mr. Hunter observes further, in support of his opinion, that these bags are as full of mucus in bodies much emaciated, where the person 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 most probably would not be the case if they contained semen. Ibid. p. 33.

The secretion of the prostatic is the last ingredient in the seminal fluid; and it contributes very largely to the bulk of
what is expelled in copulation. Its opaque whitened and
ccdent is completely obscure the properties of the fluid ex-
ited in the testis, and beded on the femoral liquor most
ous obvious characters. The opinion which supposes that the
femen is formed, or that part of it is produced in the prostate,
is not that which is so far from the truth. A thick, white,
and opaque liquor may be expressed in considerable abundance
of the prostatic ducts on each side of the caput gallinagi-
ies 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 destination.

It has been conjectured that a nervous fluid is mixed with
the semen, and hence the weakness of the male after copula-
tion has been explained. We may be excused from discoursing
this opinion until we know what nervous fluid is. The
convulsive exertion of the whole frame, which occurs in the
venerale 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
testis; that a peculiar secretion of the vesciculae 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 assign this
prerogative to the fluid secreted in the testis. In emascula-
tating animals, or men, the testes are cut or torn out, or they
are comprized so as to destroy their organization, or the
cord is squeezed or brunned so as to annihilate the functions of
the part. Yet, under the circumstances just enumerated, we read of numerous examples where venereal defiles have been
experienced, where erection, copulation, and emission
have taken place, and even where children have been be-
gotten. These examples, however, are too repugnant to the
general effect of castration, as observable in man and animals,
to allow of our admiting them.Ordinarily we observe not
only that no defiles are felt, but also that the lost of the
organs, in which the natural and leading stimulus resides, oc-
casions the other parts concerned in the business of gener-
ation to be much diminished in size, and altered in appear-
ance. Where emasculatio has been performed merely by
comprizing 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 fecun-
dating; 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 erections, since the heat of the physical
feeling is in the glands, and the whole apparatus concerned in
erection remains entire after the loss of the testis. A
man, after the latter occurrence, like one who has lost his
powers through age, may at times be flattered by the re-
collection of past joys. Hence, in the East they value
those eunuchs most highly, in whom the penis as well as the
testes has been removed; no caufe for the slightest jealousy
can then remain. The prostatic liquor, or that of the vesi-
culae feminales, might be discharged in the eunuch. If an
animal has impregnated another after castration, there may
have been some semen remaining in the vesciculae feminales.

Besides the facts now enumerated, we may observe that
all animals which copulate have testes; but that several have
either no prostate or no vesciculae.

The secreted semen is either expelled from the body, ful-
filling the purposes of its formation; or it is retained in its
receptacles, and taken up by the-absorbsents. The femoral
veins are always full of their peculiar fluids, which are only
discharged at considerable intervals, and often only at peri-
ods of some months or years. As the testis and vesciculae
feminales possess numerous absorbes, we cannot doubt that
the contained fluids are conveyed by these vessels into the
general circulation. It has been a general opinion that this
abssorption 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 animals, when the rutting season approaches, have their
whole bodies penetrated by a singular fector, so that they are
 unfit for food. The flesh at this time putrids more rapidly
than at other seasons in the flag. That absorbed semen is
the cause of this factor; is rendered probable by the fact,
that the removal of the testis destroys it; and by its absence
from castrated animals of the same species. The same cau-
horns has been ascribed to the phenomena consequent on concep-
tion 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 ex-
plained the softness and impudence of the flesh observed in
some animals after the copulating season; as, for instance,
in the boar. The flesh of the feline is remarkably charged
in colour and flavour at this time. Castration produces de-
bilitating effects both on the body and mind of man and
animals; the ferocious and powerful bull is changed into the
milky and patient ox. The influence of the same proceeds 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 not less true that the rest of the femail
organs are particularly affected by the presence and activity
of the testicles. In this country we have little or no oppor-
tunities of observing in eunuchs the effect of the mutilation on
the other organs of generation; but we can see the con-
sequences in animals. In Mrs. Hunter's opinion, the penis,
urethra, and all parts connected with them, are so sub-
ervient to the testicles, that he conceives that few of them
would have existed if there had been no testicles in the or-
ginal 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 ap-
imal 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 muscular; and that part of the canal which is called
the bulb is considerably enlarged, forming a cavity; the mus-
cles accelerators urine, as they are called, are strong and
healthy. In many animals which have long penises, 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 muscular; the
cavity at the bulb is little larger than the canal of the
urethra; and the muscles are white, faint, and have a lig-
amentous appearance. The latter observations are true, if ap-
plied to the eunuchized penis. The penis of the perfect male
is of sufficient length, when erected, to reach to the furth-
er end of the vagina of the female. In the castrated animal ft
is much shorter; and erections having thus become unneccessary, the parts which should project often adhere to the inside of the prepuce. The prolate, Cowper's glands, and the glands along the urethra, of which the lumen are the excretory ducts, in the perfect male, are large and pulpy, secreting a considerable quantity of a thin mucous, which is soft to the touch, is most probably for the purpose of lubricating those parts, and is only thrown out when the animal is in vigour for copulation; while in the castrated animal they are small, flabby, tough, and ligamentous, and have little secretion." Animal Economy, p. 39.

It must be acknowledged that we have no direct proof that any actual absorption of semen takes place from the testicles or vesicular, and from physiologists deny it altogether. "I very much doubt," says Blumenbach, "whether real semen be ever absorbed from its vesicular reservoirs in a healthy man;—still more of what has been occasionally ascertained, that it is immediately conveyed into the neighbouring veins; and most of all, that such absorption (supposing its existence to be granted) should be considered as a provision against premature venereal stimuli. On the contrary, if we compare the phenomena observed in animals, the impetuous irresistable 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 ungovernable and almost furious appetite. I conceive that a very different 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 furnace temperament, plethoric habit, lively and warm imagination, particularly if he indulges in a luxurious mode of life and enjoys perfect health. See Chr. Rud. Arenich de pollucione nocturna. Götting, 1790, etc., Inst. Physiol. sect. 36.

The length of course, and the small diameter of the spermatic artery, together with the impotibility of forcing any injected fluid from its branches into the secretive tubes of the testicles, 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 et amor," says Haller, Elem. Physiol. 7. 551. "Nemo forte fuerit, quin in juventute suam feminam concupiscent; quin si castra fuit, in ejus familiaritate ignes conceperit occultus: quia semen cum dolore et incommodo sibi tetes intumescere, et vasa feminah; dolore certe tanta, ut vix tangere poffet eam regionem, vix incedere. Manifesto in hoc malo accelerata est secrerio feminun, ejusque liquoris major penes tellent diffundit. Id mal genus e reddita tranquillitate animi, et abstinentia amote feminze sedatur; et culerus etiam fanaturn frutine capite puelae, et fœnurn remedium acceserit in difficiles tumores abire poterit. Quare in univcrsim, ut plurrimum ad movendam venerem irritamenta fœciunt defecatar feminem, aut imagines aspicet lubricae, aut alia quacunque, quae per legem affociationem ideorum voluptatis memoriam renovant; ita abstinent ejusmodi stimuli, et cogitaciones perpetuas ad alia aerever, ipsoque religio, ita minuent feminis generationem, ut multo minori copia gignatur, neque molestum fit, et denuo vasa feminis pene confectum, et genitalium moles ipsa diminuatur." A healthy and strong state of the animal, nutritious and perhaps rather generious 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 infirm health, 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 function is so 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 good condition, and in that state to which other animals that are left to themselves, can only attain in the warmer season.

That the semen, secreted in the very same tubuli of the testis, is conveyed from them into 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 diffused 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 specific 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 feminal tubes must render the passage of this fluid from its first secretion very slow: hence, when the supply contained in the vesicle is entirely exhausted, an intermission of some time is necessary for the reproduction of a sufficient supply; hence too, in the dog, where there are no vesicle, the act of copulation is unumultaneously prolonged.

It has been generally considered that the fluid produced in the testicles is deposited and retained in the testes feminales, as in revours, until occasion occurs for its discharge. Mr. Hunter has endeavoured to shew that these bags are not to be regarded in the light of receptacles for the semen, but as defined to perform a peculiar secretion. The common opinion rests on the facts of the very free communication between the vasa deferentia and vesicule, on the course which injected fluids take in the dead body, and the extreme minuteness, numerous convolutions, and great length of the feminal 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 vesicule. 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 vesicule may not confill, 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 by 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 vesicule feminales have no communication with the vasa deferentia, and moreover, that their structure, in several instances, seems little calculated to make them revours. 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 vesicule 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 that the fluid of the vasa deferentia pales into the vesicle in animals, where 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 receptacles 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 testicles to this action: for we find, that if laborious ideas are excited in the mind, and the paroxysm is afterwards prevented from coming on, the testicles become painful and swelled 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 actions of the vesicles is still kept up, and the pain in the testicles will generally continue till the paroxysm and the evacuation of the semen are brought on, which renders the act complete; without which a drop cannot be put to the action of the vesicles that produce the secretion, nor the parts be allowed to fall back to their natural state. There is at this time no sensation felt in the situation of the vesica femorales. The pain in the testicles, in consequence of their being filled with semen, and the action being incomplete, is far more considerable as to make it necessary to produce an evacuation of the semen to relieve the patient." Animal Economy, p. 33.

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

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

The transmission of the semen, from its ducts or vesica, into the urethra, takes place under the influence of a particular fluid of mind; and its expulsion from the body is effected, in all animals which have a penis, by mere action of what is called the erection of that organ. In the human subject, this is an increase of volume produced by the dilation 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 venereal 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 fecond and more powerful excitement is derived from mental causes. "Alterca causa," says Haller, "in fano homine eft imaginatio, quae cupidum vened, quod ex quacunque caufa orta, lectione, viia pictura, memoria voluptatis prifine, confabulatione, tactu, et aliis cauis, in fano homem continuo in ereessment crumpit. Eadem nocturnam illam et solitariam venerem folam abolescit, qua fe natura nimii feminis onere liberat variis, pro varia feminis abundarius, et feno acorbi aut obtufiori, intervallis. Nam puere facillima, femibus ex venus rarior eft, aut nulla. Soli homo data eft, forte quod homo potifsimum memoria et imaginatio valeat. Imaginacionem folam, non erectionem, fed plenam venerem, etiam in vigilan- 

tibus perfecte adfunt testimonium. Quae poterit abfque imaginatione excitata unquam hoc opus perfici; ut turpi, ne

que habentis adamant in femina venus vix exerceri posset. Inde ille impotentia et vereundis, ex imaginaria depletatione, quod fecemum revocat, aut ex odio, quod quidem species cum relativa potestate conjuncta eft. Hinc manifesta iniquitas ejus legis, quam ex congresso de virilitate mariti judicabat, quoniam in exofo uxor, post funeralm injuriam palam, in conspecus tot hominum, feruam opartcter effe, ut ius cum imper- 

dimentis venerae vurae perficit. Quare in Gallia anno, 1677, die 18. mensis Januarii, ridicula lex abolita fuit, cum Marchio de Langey, a judice poti congreffum pro impio 
dente damnatus, disfunto matrimonio, cum alia uxor multis filios generatet." (Element. Physiol. 7. 557.) The peculiar odor exhaled from the female organs, particularly at certain seasons, is a very powerful incentive of venereal feelings in the animal kingdom. Haller considers that this cause acts in the human race also. "Propius partes gentiles ipas adicit, et excretionem extortur, auget et perficit, frictis glandis, et potissimum collicularum, qui sunt rubis urethrae, quonqueque fide modo ca frictio administratur. Sed ea cum voluptate peculiari, fumbo, pene anima, conjugitur, aqua iterum manifeflo in nervos, ut vel ex acuto femina glandis conjiceret licet." Elem. Phys. 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 seminal fluid. When a person wakes in the morning, with the bladder tolerably full (it is an organ commonly erect); but it becomes flaccid when the water is evacuated. Striking the base of the penis with a rod is well known to produce erection; and has sometimes been reported to raise dormant passions. Calculus, strangury, and hemorrhoids are sometimes attended with this symptom; which has been occasionally observed in other affections. It is often particularly troublesome in gonorrhea; and has been observed many times after death, particularly in those who have been hanged. (See Morgagni de Sed. et Caf. Ep. xiv.) Mechanical obstruction to the return of blood from the part will produce erection, and even such a swelling as ends in gauging, if the obstacle be considerable 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 1676, in the presence of Mr. Blunt, I laid bare the penis of a dog, almost through its whole length; traced the two veins that came from the glans (which in this animal makes the largest part of the penis), and separated them from the arteries by dissection, 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 bulge 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. 40, note a.

That erection is produced by blood being sent into the penis faster than it can be returned, and that the increased size of the organ is entirely produced by this languidous dilatation, are points clearly ascertained. The obstacle 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 erector penis in particular, by drawing the organ away from the symphysis pubis, would rather free them from prejudice. The accelerometer urging, 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 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, is soft and flaccid, short, and retracted: when excited by gentle friction, 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 influence 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 are first dilated, and the glands subsequently. 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 female fluids are expelled from the excretory 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 er in venere convulso, et late patens tremor, ut femina, cui clitoris titillatur, acque se fulinire potest, acque genus concrece, et tremant, et in albis rea in plenum epilipam crumpit: nihil audit necque sentit animal in venerea tentitigne. Sunt, qui animo in venere linctuant, et feminae; tum non rari, qui in grato nimis opere perierint. Eas autem omnino major maris voluptas, etiam in plerique animilibus; non maries, praeter paucas exempla, feminas sequuntur, et nonnullum pene invitus vi subigitur: eas in viris, femnus venere praecipuam fecerunt, nullo quam clitoris major, et certe in venere tumilior. Et si aliquis feminus in sylvio uteri interiori, quando tamen eo percent, manifesti tamen mas in egerendo feminam: majoribus, quam feminam in toto venere, futilis agitatur. Quia omnino faptitidinis confiliis hacta sunt, ut virum roborare armatur, amoris dulcedo feminam redderet aequorem. Dernum et cordis vires vehementer incentitant, et pullus accelerantur, et cor palpitat, et respiratio laborat, et eadem, quae in nixu, phantoma orintur. Element. Physiol. 7. 567.

After this tumultuous agitation of the whole frame, and when the feeling of the pains and glands has reached its greatest extent, the seminal fluid is thrown into the urethra. The anus is closed by its sphinctera, and it is said that the levatores ani, by their mechanical pressure, squeeze out the contents of the prostate and vesicula into the urethra. Probably the coats of the vesicula and vasa deferentia posses some contractible power, by which their evacuation is assisted. The contents of the prostate and vesicula are collected in the bulb of the urethra, which is enlarged so as to form a kind of reservoir for them: and are expelled with force, by successive spasmodic contractions of the accelerator urethra. 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 excitement; the irritation of the heart goes off, the hurried respiration is quieted, and the strength slowly returns. The frequent weaknaess is greater, in proportion as the act has been more frequently repeated, and at shorter intervals. In many animals, where the sexual appetites are only excited at a particular season, and where the powers are exhibited and exercised on a much greater 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 Hailer. Homo adae modice sunt, ut non multo plus, quam bis in septem diebus coire possit, et forte accri amore percussus, put longam calmatem. Sema concupita potitus, aliquoties possit femen emittere. Sed ex multum repeti possit, 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 confusions 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 major et coeretia, et minus cumbus manu obtemperatur, suam illa detectabilis juvenium circe, a qua amor she, et in qua semen, multum in natura operes diffusius, elicet. Ab eo erit corrupta impotenentia infansale superius, et feminas fluxus involutaries perpetua, obigua rigiditas, tabes intra triumfum fucta, anisula judicii vis, et omne facere malorum genus, quod voles velis avertere. Elem. Physiol. 7. 573.

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 collect also, 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; "Sera juvenum Venus, etque innumera pulbetas." Men is capable of exercising the generative functions through a certain portion only of his life. We have explained that the organs 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 facte-
а 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 functions; and there is a well-known infatuation of a prince who begat twins in his 16th year. The approach of puberty is regulated to a considerable extent by the climate, and also by manners; in warm countries it comes on earlier than we have mentioned, 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 circumstances. As the individual approaches to the 55th year, the venereal susceptibility is considerably diminished. Sexen is still fettered, but hardly ever emitted during sleep, even after the longest abstinence. The venereal act is more slowly performed, but is equally efficacious in producing pregnancies. From this time the powers are gradually diminished; but a man of 62 may still become a father, although some legislators have chosen to determine otherwise. A longer continued and more powerful irritation is required to produce 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 authenticated that Thomas Parce married at 120, and performed the duties of a husband until the age of 130. These latter examples must, however, be regarded as deviations from the ordinary course; and we have equally remarkable 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 Medico-Chirurgical Transactions, vol. i. p. 276, &c. At the time of birth this child had much long hair on the head, and the features of the cranium were perfectly formed. At the end of the first year these changes took place which usually happen at puberty. The penis and testes 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 features, 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 pectorum are covered with black curling hair. The penis and testes are as large as I have seen in some adults. The latter are firm and perfect in their formation, and the color may 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 Médecine," Borden mentions three boys who had strong venereal desires 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. "Ils ne peuvent qu'en plaisir physique de l'amour; ils ne semblent avoir autre sensation que celle de cette passion; ils se fontaient, pour ainsi dire, en femmes; ils traitaient leur carrière individuelle de l'organisme féminin."

The most subtle and natural state after the age of puberty, is that of marriage. If the doings of nature are not fulfilled; if, by refusing to satisfy the impious call 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 show the effects of this powerful 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 herculean, impetuous motions, and often some convulsions are the effects of the new want in many animals. Parrots, canaries, birds, and bull-bitches experience attacks apparently of an epileptic kind, when separated from their females. The physical appetite is rarely accompanied with such phenomena in man. With many individuals, the observance of the laws of chastity hardly requires an effort. However, if the influence of the generative organs should predominate so far as to constitute a well-characterized erotic temperament; if an ardent imagination and a forced state of ebullency should strengthen this temperament, its influence on the constitution may be excessive, and cause various kinds of general disorder. Under the influence of such circumstances, a folder seized and attempted to violate a girl in public at Montpellier. Neither the publicity of the situation, nor the cries of his victim, nor the exclamations and blows of the surrounding persons, could prevail with him to relinquish his attempt, for which he was hanged. (Borden, Anecdotes de Médecine.) The unnatural-inclination observed from mistaken notions of religion, has produced very remarkable effects in some cases. Anecdotes of this mention by Buffon, in whom the feelings were very strong, fearing he should be tempted 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 apparatus destined to this function includes the generative organs, properly so called, and the breasts. These isolated parts 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 epoch, and their respective functions coöde, or at least their capacity of fulfilling them coësates 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 male 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 superior commissure of the labia, resembles 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 essential agents of the generative process in the female; viz. the vagina, with the uterus 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 comprised chiefly of folds of the integuments.

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

A broad prominence, placed in front of the pubes, and
between the gynoii, 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 accumula-
tion of an adipous cellular substance at this particular point,
and it consequently varies in size, according to the eminen-
t point of the individual. A longitudinal suture, or slit-like
cavity, extends from the mons veneris, towards the thighs,
to within an inch of the anus; this is called the vulva, or
puddendum, (which names sometimes include, in a more large
application, the external organs,) or anus pudoris. This
excavation is larger in women who have had children, than
in virgins. 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 raphé 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, from a comparison with the lips of the mouth; but
the suture between them is vertical, instead of being tran-
verse, as in the other female. Their length, which is nearly
the same in all instances, and may be somewhere between
two and three inches, determines the extent of the vulva.
Their size and prominence vary according to the general
embossing 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 possesses some
sebaceous 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 nympha. 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 adhe-
rent, and continues externally with the integuments, on the
inside with the covering of the nympha; 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 con-
founded with the mons veneris: the posterior, growing
gradually smaller, ends in a point, and is united with that of
the opposite side behind the fossa navicularis. From this
union a sharp prominent ridge results, called the commissure
of the labia, or frenulum, and in French la fourchette.
The following parts enter into the composition of the labia;
1st, a continuation of the skin forming their external surface
and inferior or convex edge, provided with sebaceous glands,
in the secretion of which the distinguishing odour of these parts
refides: 2ndly, 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 tissue 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 con-
tinuous, but it presents, in addition, some membranous la-
minal descending from the ischium and pubes to the loofe edge
of the labium. It does not contain so much fat as the mons
veneris, and hence, like the cerumen of the male, it is a part
in which anaesthetic deposits are frequently observed.

The labia cover all the other external organs of generation,
which, by this means, are constantly moistened with a mucous
fluid, preventing the effects of friction, and preparing 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 pro-
ceeding to describe: they are separate only when the thighs
are thrown widely apart; they receive an extraordinary de-
velopment during parturition, and thereby increase the capa-
city of the vulva. When the labia are separated, the fol-
lowing parts may be observed in succession from above
downwards: 1. The clitoris, which appears as a small tu-
brcle, more or less prominent, separated from the upper
commisure of the labia by a small smooth surface: 2. The
nympha, alae minores, or petita leaves, arising from the in-
ferior 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 meatus urinaris, on the
sides by the nympha, and sometimes called vestibulum: 4.
The meatus urinaris, situated about one inch below the
clitoris: 5. The orifice of the vagina, with the hymen, or
caruncula myrtiformes, placed immediately under the meatus:
6. The fossa navicularis, a small transverse depreflion, sep-
arating the entrance of the vagina from the frenulum: 7. The
frenulum, or posterior commisure of the labia; behind
which is the perineum. The clitoris occupies the upper
part of the vulva, and forms a reddish flatly elevated tu-
brane. It is nearly the same height in virgins and chil-
dren, but in the latter the organ does not exceed the level of
the labia. Its figure is obtusely 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 distinguish 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 dilation, 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 po-
terior surface of the rami of the ossa innominata; ascend,
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, con-
fluged with the perioleum, forming a tube filled with a cellular
or spongy substance, into which blood is ejected from the ar-
teries, 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 substance 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 erect state.

The erector clitoridis muscle is analogous in every re-
spect to the erector penis of the male; its origin, termination, and
probably use, are similar, but the size is smaller in propor-
tion to that of the crura. It arises from the inner surface of the
ischium, ascends and palies forwards, and is implanted in a
tendinous form, in the inferior and posterior extremity of the
crus 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 bithel below. The loofe and
folded prepuce covers it above and at the sides, but not be-
low, being attached to the two sides of the slit, by which the
part is marked in this situation. A white, friable, sebaceous,
and concreting substance, similar to that formed by the gland
ulose odoriferæ of the penis, is deposited under the preputium
clitoridis.

This secretion, being liable to accumulate, and becoming ir-
ritating in warm countries, as is 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 fulpenoxy ligament; below to the urethra, to which it is united by a loose cellular tissue.

It resembles the penis in its acute configuration: "fenus minis vehement, ut tota crura ab eis particular sollicitatione contineantur, feminique toto extra feponantur, nihilique passit prope necare. Quam extra venerem, in cafta feminam parva fuerat, sed ei mado argirit et intumescit, ut prepositae veneri inferiore passit, multoque su ejs turbidum denique moles eis augerat, ut omnia membra furent, cubus multum utiuram. Quae caufla videtur suIfie, cur orientales populi, accurati caftitatis mallebris cultvdo, hane particular in nuper natis puellis amputaverint, aut tertae ferro decorataverint." Element. Physiol. lib. 28. § 26. We have made some observations, concerning the occasional increase in size of this part, in the remarks on hermaphrodites.

The nymphs are two membranous folds, connected above to the prepuvium clitoris, and descending as far as the middle of the aperture of the vagina. They are thin and flattened, broadest 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 urinarv 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 prepuvium or glans clitoris; 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 vesuvia, 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 unusual 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 possess considerable sensibility. The chief use assigned to them is that of affiling, 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 nymphae 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 stream seems to depend fo 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 males where they can have nothing to do with the action of uriine.

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 case 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 vallcular 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, by the following quotation, that the existence of the hymen hangs by a very slender thread: "L'hymen, pendant le premier age, est tres mince, il rompt facilement et se detruit, lorsqu'on effuse avec trop peu de manegement les parties exterieures de la generation, fort leregue l'enfant humain, avec ou sans intention, contracte des habitudes. Les biennes, prepare et difpofe anfi aux plaisirs folitaires, des organes qui sont a peine echoues." Morcan Hist. de la Femme, tom. i. 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, vallcular, and sensibile. Generally it has the shape of a crescent, with the concavity turned upwards or forwards. The convex edge is attached, the concave loose; 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 urinarv, below or behind, and at the sides, by the loose concave edge of the hymen. The dimensions of this opening must depend thereforo on the breadth of the hymen, which differs much in different individuals; ordinarilv, it will admit the little finger without any stretching. This crescented or faithful 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 discharge. 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 examinied in water, generally continued under the urethra; but very narrow at that part. In more rare cases the hymen is an imperfect 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 ossetae, 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. F. Tolbeng, de varietate hymenial, Hal. 1791, 4to.

It has generally been affected, that the hymen does not exist in quadrupeds; but the statement of Couffer, in his Leçons d'Anat. comparées, tom. 5, leçon 29, fect. ii. art. 2, renders this point very doubtful. The general opinion of its non-existence in the other mammalia is no doubt more powerful man, and the circumstance of its being found in women only; at a particular period of life, and even then not universally, has led many anatomists to deny its existence in the human subject. But the fact is so clearly proved by the concurrent testimonies of all modern anatomists, who have enjoyed considerable opportunities of dissection, that we wonder to find Buffon still contending the point; any of his anatomical friends might justly have convinced him by ocular 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 disgraceful opinions and practices which have prevailed on this subject. "Les hommes," says he, "jaloux des primâtes en tout genre, ont toujours fait grand cas de tout ce qu'ils ont cru pouvoir poffeder exclusivement et les premiers; c'est cette espèce de folie, qui a fait un être réel de la virginité des filles. La virginité, qui eût un être moral, une vertu qui ne consiste que dans la pureté du cœur, est devenue un objet physique dont tous les hommes se font occuper; ils ont établi sur cela des opinions, des ufages, des cérémonies, des superstitio, et même des jugemens et des peines; les abus les plus illicites, les contraintes les plus déshonorantes ont été autorisées; on a founis à l'examen de matrones ignorantes, et exposé aux yeux de médecens prévenus, les parties les plus fragiles de la nature, sans songer qu'une pareille indécence eût un attentat contre la virginité; que c'est la violer que de chercher à la reconnaître; que toute situation honteuse, tout état indécen, dont une fille eût été obligée de rompre intérieurement, eût une vraie dégradation. Je ne permets pas de faire à détruire les préjugés ridicules qu'on s'est formés sur ce fujet; les choses, qui sont faites à croire, feront toujours crues, quelque vaine et quelque déraisonnable qu'elles puissent être; cependant, comme dans une histoire on rapporte non feulemte la fuite des évènemens, et les circonfiances des faits, mais aussi l'origine des opinions et des erreurs dominantes, j'ai cru que dans l'histoire de l'homme je ne pourrais me dispenser de parler de l'idole favorisée à laquelle il sacrifie, d'examiner quelles peuvent être les raisons de son culte, et de rechercher si la virginité eût un être réel, ou ce n'est qu'une divinité fabuleuse."

It is not so easy to explain the use or purpofes of this membrane, as to establish the fact of its existence. The partifans of final causes have been much puzzled in attempting to display the wisdom or goodnefs 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 unfatisfactory. "Vix tamen dubites, cum folo in hominum fit reportus, etiam ad morales fines efie conceitum figum pudicitiae, et vitium illatum cogitofarum, et pars virgo decus fuam potius tueri, et ipse maritus de culpitate foamente facile convictur, eo facilis, quod præterea in illa virgine anguilla fit. Ete enim potius heri, ut luxus, ut parvis fit hymen, atque prima venus aliquid ab affine fanguine abfolvatur, acque hymen rumputur; eth artificem porro in param pudica

femina linguos posuit celi; eti tenere virgines aliquando etiam in altero coitu figum necéu reddant, et membris fluentes vaginae laxant: tamen in univerfo debet prima venus cruentu eft, coquenfigno pudor virgines adefit, cum vis potissim plena venas obtineri, quin fuperior margo partis majoris hymenis laceratur. Quare et modicum leges, et multorum populorum confuetude, hoc figum fervata cafalitatis et requirant et offenfent, et de exemplis in virginiis etiam rarius certus fum, qua illegitum in prima venere fanguinis fucturae fum paffa."

Elem. Physiol. lib. 29, fect. 2, art. 17.

After the hymen has been torn, the entrance of the vagina presents some flemily prominent tubercles, called carunculae myrtiformes, and varying in number and size. These are generally considered to be the remains of the lacerated membrane; "et corrupte adeo pudicitiae 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 spicés of the columns of the vagina. Lastly, there are projections at the termination of the mucous ducts, which may be enumerated among these carunculae: and warts are sometimes found in this situation. Whatever their origin may be, we find from two to five or fix round and firm, or thin and loofe prominences, of a red or livid colour, about the entrance of the vagina.

The frenum, or fourchette, is a cutaneous fold of a crescent shape, with the concavity upwards, placed behind and below the entrance of the vagina, visible in the virgin state, 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 nymph, 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 perturbations entirely efface it. A very manifefl transverse cavity, named the foffa navicularis, is intercepted between the frenum, the hymen, and the labia; and this cavity is lost of course when the frenum disappears, fo that it may not be recognizable in married women.

A mucous membrane, by which the penial 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 at their commissures; covers the internal surface of these folds, the space below their anterior commissurum, and the foffa navicularis, then forms the nymph and preputium cliteridis, 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 confefted 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 attains 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 diffinition, and an epidermis can be distinctly demonstrated at its origin.

The colour proves that it is copiously supplied 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 subflance of the membrane, where they terminate by cul-de-faces. These, which are called lacunae, are similar to what we have described.
The internal Organs of Generation.—The vagina, or canals uteri, is a membranous canal, extending with a very slight obliquity from below upwards, and from before backwards, from the vulva to the neck of the uterus. Its anterior portion is nearly transverse; the posterior ascends towards the urinary bladder. It lies in the middle of the inferior aperture of the pelvis, between the uterus and bladder, which are in front of it, and the rectum which is behind it. The ordinary length of the canal is from five to six inches, and the breadth one inch; but as it is very extensible, these dimensions are subject to change. It is narrower, but at the same time longer in the virgin, than in married women; during parturition its size is equal to that of the child’s head; it is very capacious after delivery, so as to be three inches in diameter; but it soon regains its previous size, never however returning to the narrowness of the virgin state. Its form is nearly cylindrical, but somewhat flattened towards its anterior extremity. It is slighly bent towards the pubis; its two extremities are obliquely truncated, so that the anterior surface 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, sloping upwards and slightly convex, corresponds to the bladder and urethra, being connected to the former by a loose cellular texture, and very intimately united with the latter by a dense and firm substance. The posterior region, sloping 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 intestine; while the inferior part, possessing no such covering, is connected to the intestine by cellular substance. This connecting 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 ucters, to the plexus formed by the blood-vessels of the uterus and vagina, and below to the levatores ani. The internal surface of the organ presents a great number of folds and prominences, which make it irregular throughout. These cellular rugosities exhibit a most elegant arrangement in the fetus and in the virgin; they are indistinct 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, moderately transverse, but sometimes partly oblique. These prominences are jagged laminae, ending in a thin edge, turned towards the opening of the vagina, differing in size and variously interwoven with each other. On the anterior half of the canal are raised two prominent columns: an anterior and a posterior one. These are beset with hard and nearly cartilaginous warty prominences, closely arranged, of a roundish figure, and circumferentially grooved. The anterior column is the largest, and corresponds to the orifice of the urethra. Frequently this is bifold towards the front, and its two portions, joined by transverse ruggae, end in the hymen. The front end of this column sometimes projects like a papilla at the orifice of the vagina. The posterior smaller column is exactly opposite to the anterior, and corresponds to the rectum; sometimes it is hardly distinguishable. This ends also in the hymen, and in some instances projects anteriorly like the anterior column, but less considerably. From each of these columns, hard, cartilaginous, transverse or oblique folds are extended; they project downwards.
have a jagged edge, and are mixed with verrucous and other left prominent laminae in various directions. Between the two columns is a reticulated surface, formed from the transverse productions. The use of this structure does not seem very obvious. It may possibly facilitate the dilatation of the organ. "Voluptatem et etiam angere cedere, nihil in uteri cervix imitates valvulae recte. Ancient tamen emittendo vaginam; et inferior columnar partis glandis feminae vicinae occurrunt. Scilicet vaginam etiam facere credas, quod ob has veluteras et inpa magis constrictur. Infinicibus tamen funeste lego," Haller, Elain. 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 white, milky kind of fluid; and it is a true mucus in the adult. The floor of the generative canal seem to be merely a dilated tube 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 observable among the folds and rugae of the vagina. Epithelium noticed linings in the membrane; i.e. tolerably large slits, sometimes ramified, and containing mucus. No glands can be discovered in the organ.

The inferior extremity of the vagina is united to the inferio part of the neck of the uterus. It embraces the latter organ obliquely, so that the anterior surface of the vagina is nearer to the os uteri, and the posterior is more remote from it; and the cavity 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 possess considerable thicknes and strength. The upper half of its posterior surface is covered by peritoneum. The chief substance of the canal is a thick, close, and firm texture of a greyish colour, poliling 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 substance of the uterus. Below it is surrounded by a kind of corpus cavernosum, of about an inch in breadth, and two lines in thicknesses, composed apparently of veins, and called the plexus rectiformis. A determination takes place to this part at the time of coition, 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 peritoneum, and by the plexus rectiformis, the surface is surrounded by a copious cellular substance, containing many vascular ramifications.

The vital properties of the sides of the vagina are not well understood. Some ascribe to it a contracible power, excited, as it is laid, in coition and felt by the hand when introduced in the process of midwifery. The phenomena of parturition shew that it possesses a high degree the powers of extension and subsequent contraction.

The internal surface of the canal is lined by a mucous membrane, to which the peculiar tuffice of the vagina already mentioned adheres very closely. It is continuous with the membrane of the vulva; and, after lining the vagina, is extended over that portion of the cervix uteri, which projects into the canal, and communicates, at the os, with the lining of the uterus. This mucous lining forms all the inequalities already described; it is thicker near the vulva, and grows manifestly thinner towards the uterus. At the entrance of the canal it has a red colour, which changes further into a grey or whitish call, diversified near the cervix uteri by the livid spots already mentioned, which give it a marbled appearance. The almost cartilaginous hardcnes of the membrane in some parts is peculiar to the vagina, as well as the permanent folds in its structure; in other mucous membranes the inequalities are occasioned by some external cause, and disappear by extension. Some anatomists ascribe an epidermis 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 rectiformis. It depends on each side from the body of the clitoris, behind the cecum; surrounds the anterior extremity of the vagina, immediately behind the labium, where it presents considerable 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 weli known; the nerves come from the facial trunks.

The uterus is the organ in which the fetus and its coverings are contained until the time of parturition. It is almost always fleshy; in some rare cases there have been two uteri. There is some variety in these instances; either there may be two uteri and two vaginas, or one fleshy vagina divided by a septum in its whole length, or only 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 authors who have related examples of all the above-mentioned unusual formations may be seen in Voigtel's Pathologische Anatomie, 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 downwards and rather backwards, the neck downwards, and slightly inclined forwards. Two broad folds of peritoneum, named the ligaments lati uteri, fix it to the side of the pelvis. Other ligaments assist in maintaining this 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 flattened 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 tubes, the peritoneum, the ovary and its ligament. The three other margins are adherent; 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 substance. They fix the uterus in its situation, and give it a covering, in proportion as it increases 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 immediately to 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 uterine vessels are separated from each other, and they appear under the form of crescents, 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 veins, 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 sacrogenic cord does in the male subjacent, and escape to 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, confining 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 prolapsus or defect of the uterus. Dilatation 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 unprimiparous female, its length is about 2½ inches, its thickness one inch, its breadth at the fundus 1½ or 2 inches, and at the cervix about 1½ lines. Although it returns after parturition to its original size, it never becomes again so small as it was in the virgin. Its figure is whole on the triangular, with the base upwards, and the apex downwards, and flattened from before backwards. It is divided into two parts, a superior and 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 incised 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 vificus. 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 tine. The latter name has been given to it from a comparison to the mouth of the trench; 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, 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 tine, 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 chops, separated by a kind of tubercles. The os tine 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 inferences drawn from the state of this part, in infancies where infantilism 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 further 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
dividing 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 shortest; 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 blood forms 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 two cones, joined by their bases. Such is the figure which it constantly exhibits in women who have never borne children; but, from the time of conception, that extremity 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 bases 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 callous rugulations, 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 arborececent 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 tinnne. 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 lamina diminishes insensibly, and they disappear on the sides of the cavity, where the anterior and posterior ones are confounded 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 confused; this is still more remarkably the case just after parturition; the laminae are then nearly destroyed, and the arborececent appearance almost entirely effaced.

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

In the cervix uteri we may notice the openings of numerous lacunæ or short ducts, ending in cul-de-sacs, concealed among the rugulations already described. Most of these are small; some are larger and longer. There are fix or seven just above the os tinnne, 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 lacunæ 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 poising any excretory duct. They adhere to the trunk or branches of the arborececent 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 held 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 thickens 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, or a proper tissuc, of an internal membrane, of arteries, veins, lymphatics, and nerves.

The external membranous 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 viscus to the rectum. It adheres everywhere to the proper tissuc 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 tissue forms nearly the whole thickens of the organ. It is a greyish, dense, and very compact substance, very resiliency to the scapal or seffuous, 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 paler and more condensed in the cervix than in other situations, where they are softer and more red. Although in the empty state of the organ these fibres have scarcely any of the characters of mucularity, 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 tissue of the organ, that it seems to form one fibrous membrane with it. It is reddish in the body of the uterus, and whitish in the neck. It is perforated by an infinite number of pores, which are merely the extremities of exhalant vessels, and give sile to the menstrual discharge.

Appendages of the Uterus.—Under this name are included...
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 superior 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 is 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 distended with air or aliment, may displace them in different directions. The caliber 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 bristle. 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 the contrary in that portion of the peritoneum which constitutes the tube. 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 fimbricai (pavillon de la trompe; moreau frangé). When this part is examined in water, it has a very beautiful appearance, and seems composed of small separate leaves, like some 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 fimbricai are conceived to possess a muscular structure.

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 every where more or less prominent longitudinal lines, considered by some anatomists to be muscular fibres. Indeed the office of the tubes seems to require the existence of contractile fibres in their composition: 3. Of a spongy tisue, compared to that of the urethra and corpus cavernosum, but the real nature of which is not understood. Very numerous blood-vessels are distributed in this substance, which appears to swell and experience a kind of erection in the act of copulation: in consequence of this the fimbricai are applied to the surface of the ovary; 4. Of blood-vessels, derived from the spermatic arteries and veins, of lymphatics, and nerves furnished by the renal plexuses.

That the office of the tubes is immediately connected with the baffices 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 left, and present nothing remarkable except slight tubercular risings. The inferior margin adheres to the posterior edge of the broad ligament. The external extremity is connected to the longitudinal of the Fallopian fimbricai; and the ligament of the ovary is attached to the internal end. This ligament is a small fibrous cord, about 1/8 inch long, contained in the posterior part of the broad ligament, and fixed to the angle of the uterus behind the Fallopian tube. Some old anatomists regarded it as a canal defined to convey into the uterus the semen, 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 ovum 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 following the broad ligament; 2. Of a proper membrane, of a white colour, and firm fibrous texture, hardly separable from the proper tissue 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 smaller. These bodies are placed in the cellular or spongy substance of the ovary, in which they may be said to be enclosed; 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 supplied by fillets, 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 internally, and containing a clear, sometimes yellow or reddish liquor, coagulable by heat and alcohol, and forming white threads, like the albumen 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 iliac. The former are more tortuous than the corresponding vessels in the ovaries; passing 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 some along the round ligaments, which communicate with small branches of the epigastrics. The chief arteries of the uteri are the uterine branches of the internal iliac trunks; the right and left. This artery first runs downwards, then runs 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 sinus, 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 ascends to the upper edge of the broad ligament, are distributed in the Fallopian tube and round ligament, and communicate with the spermatic.

The veins, like the arteries, may be referred to two divisions; the spermatic 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 loin, 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 vasa, but are of general less tortuous. They communicate freely with the spermatic. 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 vessels, 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 spermatic vessels, to terminate at the glands in front of the aorta and vena cava near the kidneys.

The nerves come from the great sympathetic (the hypogastric and spermatic plexuses), and from the faecal pairs.

**Vital Properties of the Uterus.**—Until the period of impregnation, this organ seems to possess only that modification of sensibility and contractility, which are necessary for the purposes of nutrition, and the menstrual evacuation. It seems doubtful whether or no it is endowed with animal sensibility in its healthy state. It has been imagined, and asserted, that the contact of the gland penis with the os tunicæ, in coition, is one source of the physical sensation experienced by the female on that occasion: this we conceive to be problematical. Haller 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 exist in the natural state or no. The same observations may be applied to the vital properties of the Fallopian tubes and the ovaries. However obscurely the vitality of these organs may be exhibited, when not immediately engaged in the exercise of their important functions, it is manifest 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 subsequent 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 temperament; pregnancy and its various epochs; parturition 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 relief, of lively impressions, nervous and spasmodic affections, the influence and general result of which must be carefully attended to in appreciating the nature of woman, and the part which she has to fill in society. When we consider these facts, and reflect that the inclinations, the appetites and tastes, in a word, all those qualities which impress the distinctive character on any animal, flow from the conformation and predominating influence of certain organs, and are modified by their degree of perfection, and the energy of their functions, we shall have little hesitation in referring the peculiarities of the female frame and constitution to the action of the generative organs taken altogether; an opinion which is expressed in a more limited way by Van Helmont, "proper uterum folum, nulli elidit quod eft."
mark, is nearly white, and does not exhibit those successive
plades which, at a more advanced age, distinguish its orifice,
itself, and its posterior extremity. In the newly born
child, and during the first three years of life, the uterus does not
occupy the cavity of the pelvis: together with the ovar-
ias 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 elong-
gated, has not the triangular figure. The parietes of both
are thin, and the cavity very small. The tubes are propor-
tionate in length to their future state.

From birth till puberty, the generative organs of women experience fewler changes than those of men: yet they
grow in proportion as the body enlarges; and thence, which
at first were remarkable for their size, as the clitoris and
labia, gradually lose this distinction. The uterus appears
below elevated above the pubes, in proportion as the pelvis
changes its form and proportions, and as the superior ap-
erture becomes less inclined. It enframes principally in breadth
and thickness, but its growth is not very rapid. The changes
which occur at the time of puberty, considered in an anato-
mical point of view, are not considerable: there is a remark-
ably 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 particularly adapted, 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 func-
tions, and many parts of it partake the general emaciation.
The prominence of the mons veneris is nearly effaced, and a
great part of the hair, which covered it, is lost; the remain-
der becoming grey and straight. The labia and nymphae
are soft and flaccid; the latter sometimes can scarcely be
seen in the vulva: the membranous membrane is whitish, or at least very
pale in its colour. The state 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 dense, and marked with deep
grooves, so as to render the surface tubercular; in other in-
stances, their substance 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, di-
lates after it has received the gurm from the ovari, and en-
larges 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 product of conception by
virtue of the vital properties, with which it has been endow-
ed, 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
pregnancy.

The anatomy of the gravid uterus has been most fully
elucidated by Dr. William Hunter, whose splendid and beau-
tiful plates form an epoch 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. Bailie, from the papers of Dr. Hunter, contains
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
cafe than in another; 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 women who have twins, or a very large child,
are commonly observed to be very big, yet the greatest num-
ber of those who are really very much swelled out, are fo
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 the cerv-
xix and os uteri to the small end: but the fundus is larger and
more flat, or less pointed, in proportion to the lower extrem-
ity 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 changes, the fi-

gure of the uterus differs from the regular oviform, from a
variety of accidental causes, as it adapts itself to the neigh-
bouring parts, to the attitude of the body, and to the posi-
tion of the contained child. In order to conceive these va-
rieties more easily, we must remember that in most cases the
uterus is not so completely filled as to be upon the full flretch.
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 plastic, and moulds itself
into various shapcs 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 psoas mus-
cles and iliac vesels, mould the outside of the uterus into cor-
responding cavities. The attitude of the body influences
the figure of the uterus, as the parts against which it rells
vary in different postures. The position of the child is an-
other caufe 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 fetus,
by examining the outside of the abdomen. The round projec-
ting 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 itself into two distinct
bags, for 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 corre-
sponding 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 di-
tance between the insertions of the Fallopian tubes may be
much smaller either before or behind than in the opposite di-
rections. In the unipregnated state, it has commonaly 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 cafes of pregnancy; and may elucidate the above-mentioned case 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. The 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 parietes 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 umbilical regions of the abdomen, the loofe connections of the intestines and omentum easily 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 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 forepart of the organ into a greater rotundity, and its axis then approaches the nearest to a tranverse or horizontal line. In the recumbent posture, the contrary situation is exhibited. In a first pregnancy, the uterus fleshes itself higher up in the epigastric region, and its axis comes nearer to the longitudinal or vertical direction, because the parietes 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 loofe and pendulous, and the uterus extends forwards rather than upwards. This position is more remarkable in very fhort subjects; because in them the chell is fo near the pelvis, that the uterus is stopped in afeint. The fame circumstance happens, and for a fimilar reason, when the pelvis is very narrow; as no part of the organ, in fuch a cafe, can be lodged in the pelvis, it muft be placed proportionally higher. In a very fhort and crooked woman, on whom the cafarcan fcction was performed, the fundus uteri was not only turned forwards, but even a little downwards. As the laws upon the table, the navel could not be seen, as it was placed on the posteriour and inferior part of the abdominal tumour. In order to expofe 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 fide cannot, in general, be very coniderable; as it poiffeles nearly the whole space between the hip-bone, and its lower extremity is fixed to the pelvis. A fmall lateral obliquity is very common; and we can easily fuppofe, that in a reclin’d posture, the projeftion of the lumbar vertebrae will throw rather more than one-half of the uterus into the lateral cavity between the fpine and one hip-bone. We know, indeed, that in all the laft months, the abdomen is often more full on one fide than on the other. Women lay in fuch a cafe, that the child lies on one fide, and they judge rightly. Where the child lies the bulk muft be both more coniderable and more permanent, but where there is only uterus, plaencta, and water, the swelling will be fouter, and project fets. The prefure of the child, when it lies more in one fide than in the other, makes the limb of that fide weaker, more benumbed, and more liable to cramps, and edematous 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 fide of the organ than they were in the unimpregnated state; and the reafon is very obvious. The periftonal coat of the uterus makes the broad ligament on each fide, much in the fame manner as the analogous membrane of the inteffinal tube makes the mefeiery. When the woman is not pregnant, the ligament is of confiderable breadth, the fpermatic veifels pass between its two laminae, the round ligament runs downwards and outwards, on its anterior furface, and the tube runs in loofe ferpentine 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 furface, and their anterior lamella the anterior furface of the uterus itself. We obferve now, that the round ligaments do not run down on the fore-part of the broad ligaments, but upon the forepart of the body of the uterus itself. In proportion as the fundus rises upwards, and increases in fize, the upper part of the broad ligament is fo fretched, that it clings clofe to the fide of the uterus, fo 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 fpermatic veifels passes over the iliacs, to the fide of the uterus. In this flate, although the small end of the tube opens into the fame part of the uterus, as before impregnation, yet the tube has a very different direction; instead of running horizontally outwards, it falles downwards, closely attached to the fide of the uterus. Behind the fimbrace lies the ovarium, also connected to the uterus. The fimbrace and ovarium are commonly placed upon the iliac veifels, or flefty brim of the pelvis, behind the group of fpermatic veifels.

The round ligaments run almost perpendicularly downwards from the fundus uteri to their paffage through the muscles; they are confiderably enlarged in thickness, and are fo vascular, that when injected they ftm to be little more than a bundle of arteries and veins. Their arteries are all conflouled. Both their arteries and veins proceed principally from the fpermatics, and amalgamate evidently with the external veifels in the groin or upper part of the labia. Even in this enlarged flate of the round ligaments, it is very difficult to fay how they terminate in the groin; they appear to be infenfibly lost. The tubes are more flefty, vascular, and fift in their fubflance, and are lefs conflouled than in the unimpregnated flate. The fimbrace and internal rugae are larger and much more beautiful, expeffially when their veifels are well injected. The ovarium, excepting that which contains the corpus luteum, feem to have undergone no remarkable change. The latter body can be diftinguifhed by a rounded fullness; and frequently a coniderable prominence, fenfible both to the fight and touch, upon the middle of which there is a small pointed cavity or indentation, like a cicatrice. Upon ftitting the ovarium at this part, the corpus luteum appears a round body, of a very diftinct nature from the reft of the ovarium. Sometimes it is oblong or oval, but more generally round. Its centre is white, with some degree of tranparency; the reft of its fubflance has a yellowish cast, is very vascular, tender and ftible, like glandular flesh. The larger veifels appear round its circumference, and fend smaller branches inwards. A few of the larger veifels are situated at the cicatrice or indentation on the outer furface of the ovarium; and are there fo 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 ovarium, or one in each ovary. The sex of the fetus has no relation to the corpus luteum being formed in the right or left ovary.

**Thicknefs 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 diffolved state, though there may be some difference, the thickness, 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 vessels, and particularly the veins, are pretty well filled with wax, its thickness is thereby considerably increafed, more especially where the placenta is fixed, on account of the number and size of the vessels at that part. For this reason only, perhaps, the uterus is thick at that part, and for the same reason it is thicker towards the fundus than near the cervix. Much variety may be observed with respect to thickness; and such inequalities in the same 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 thickness 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-vessels.**—There is no circumstance, in which the gravid uterus differs more from the unimpregnated, than in the size and termination of its vessels. The arteries, both spermatic and hypogastric, are very much enlarged. There are infinite numbers of anastomosing arteries through the whole substance of the part, so that the whole fyltem makes a general net-work, and the branches are convoluted or ferpentine in their course. None of the larger ramifications are seen for any length of way upon the outside of the uterus. As they branch from the sides, they disappear by plunging deeper and deeper into the substance. The arterial branches, which are much enlarged, are those which run towards the placenta; so that, wherever it adheres, that part appears evidently to receive by far the greatest quantity of blood; and the greatest number, both of the large and small arteries at that part, pass through to the placenta, and are necessarily torn through upon its separation. The veins of the uterus appear to be still more enlarged, in proportion than the arteries. From the sides of the uterus they ramify through its substance, 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 most frequent communications which we know of among the vessels 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; so that, when the venous syphon of the uterus is well injected, that part is evidently the chief source of the returning blood. Here, too, both the large and small 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 these vessels, they grow more flat and obscure; because the uterus itself becomes more filled and tense, which has the effect of com-

preffing the veins that run in its substance. On account of the large size of these vessels, and the appearance of cavities, which they exhibit on a section, the name of *funnet* has sometimes been given to them.

The lymphatics are more numerous, and many of them larger than could have been imagined. They pervade the substance of the organ universally. Its peritoneal coat appears, like that of a calf's fleece, to be interwoven with a crowded plexus of these vessels; and where they get to the sides of the uterus, when filled with mercury, some of them are even larger than a goose's quill. Some are remarkably varicose, 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; so that, when an incision is made into it, the wound can be easily made to open wide; or if a narrow strip be cut out, it can readily be extended to at least twice its original breadth. This laxity appears to depend on two causes: viz. the great quantity of large vessels in its composition; and the loose connection between the fasciculi of its fibres. When we speak of the muscular fibres, it is difficult to treat the subject with precision. We neither know their external appearance, nor their internal composition. They only manifest themselves to our senses, when numbers of them are collected into bundles, and make what we commonly call muscular fasciculi. 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 immediately after death. In many places, particularly of the internal surface of the uterus, these fibres have the same striking fusciculated appearances as we observe in common muscles; yet they are of a paler colour and harder texture. Dr. Hunter examined 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 passed off with the lochia, so that the fasciculated stratum 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 facciculi left oval spaces between them, for the passage of arteries and veins, somewhat like those separations in the tendinous fibres of the abdomen and loin, where vessels pass out to the cellular membrane and integuments. The cervix uteri, where the rugae are situated, had not such regular nor so large fasciculi as the rest of the uterus. In the body of the organ the fibres were very regularly circular. The fundus 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 stratum was removed, the fasciculated appearance and regular direction of the fibres was lost and lost apparent, in proportion as the distinction was continued outwards; which seemed to be owing in great measure to the infinite number of branches and communications of the large veins. Afterwards, says the doctor, I had the most favourable occasion that could be devised, for examining the fibres on the inside 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 flooding 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 stratum of the decidua, through which the muscular fibres appeared, but with some degree of obscenity. Upon rubbing off this tender membrane with a cloth, it gave me pleasure.
pleasure to see how exactly the above description agreed with the appearances.

The existence of mucular fibres in this organ has not, however, been universally acknowledged. "Respecting the alleged mucular texture of the uterus," says Blumenbach, "I must observe that all the human uteri, which I have carefully examined both in the pregnant and unimpregnated condition (and I have had opportunities of such investigations, not merely in preparations, but in the most recent state after death) have not exhibited any thing that could be taken for genuine mucular fibres. The advocates for the mucularity of this organ must allow that the fibres differ most remarkably from all others in the body. I am more and more convinced every day that the uterus poiffeys no true irritability; but that it poiffeys, if any part of the body can be said to poiffeys, 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 fo singular and peculiar to the old physicians and philosophers, that they called the uterus an animal contained in an animal." Phyiolog. Institut. Phyfiolog. p. 422.

The mouth of the uterus differs considerably in the different times of utero-gelation. For the greatest part of the nine months, that is, till the cervix uteri be fully diffented, there is a projection of both the anterior and posterior lip of the os tinctae; 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 rugous hole, often not readily discooverable by the touch on the lower or posterior part of the rounded lower end of the uterus. The border of this 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 gluten, which floats across, and plugs up the inner part of the orifice. This gluten is commonly squeezed out from all the lacerae, 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 gluten swells out more and more from all these cavities, and then separates entirely. Then the innumerable lacerae, which contained it being empty, are very visible. And if the gluten be thus carefully taken away, and be floated in water, its external surface is seen beautifully ornamented with all the procedees which were drawn out of the innumerable lacerae.

Dr. Hunter gives us the following account of the uteri in the earlier months of pregnancy. "In the third and fourth months, the substantia of the uterus is become more soft than before conception, and all its veiles being proportionally enlarged, it appears to be much more vascilar. We may, therefore, reasonably believe, even if we knew nothing from defections of quadrupeds, that the uterus changes its nature in that respect from the time of conception, and receives a greater quantity of blood. Its thickness is only a little increased in its natural state, but conferndly when the veins and arteries are artificially diffented 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 stretching then down into the cervix uteri, or that part of the uterus, which is narrow and rugous within."

The cervix uteri remains contracted and hard in its substantia, and contains a tough and firm jelly, which cements 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 substantia of the uterus itself, as through the cementing jelly. When the uterus is kept a considerable time in water, six or eight days perhaps, this cementing jelly swells, grows in proportion fatter, 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 rugae, and innumerable intermediate narrow, but deep cavities, which lodged so many proceedees of the jelly. In separaring the jelly, when by previous maceration it had been fit for such an operation. I have seen these proceedees 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 proceedees 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 gelatinoas cement. The os uteri, all around its pauffage, is crowded with small cavities, containing the fame fort of jelly, which by maceration swells, puhes 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 defections, 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 sponging, 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 conceived 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 ovarium are very different at the different periods of utero-gelation. In the earlier months the corpus luteum is considerably larger and more vascilar; and within it there is a considerable and evident cavity containing a fluid. When the uterine veins have been injected, I have observed that the wax very easily extravasates into that cavity. On the outside of the ovarium there is a little pit, which looks like a hole, leading into the cavity of the ovarium. But in the cases which I have seen, no brililes would pass; it appeared to be an obliterated duct, or pauffage grown together."

The serous covering of the uterus, derived from the peritonem, undergoes very considerable extension during the enlargement of the uterus in pregnancy. We have already shown that the broad ligaments nearly disapper at this time, but there is no accession of the fame kind either before or behind, as the bladder and rectum full continue to be covered to the usual extent by that membrane. The increased surface of the peritonem must be ascribed therefore to an extension of the membrane.

As the mucous surface of the organ is the medium of communication between the uterus and the feuminalides, its changes refer to the purposes accomplished by this connection. In the natural state, it exhibits merely the fine orifices of exhal-
haling vessels, but after conception a large number of con- 
derable arteries and veins pass from it to the surface of the 
ervum; and these are more numerous and large in the situa-
tion of the placenta than elsewhere. These communicating 
vessels have been described already in the article EMBRYO. 
Toward the latter periods of gestation the utrva becomes 
swollen and relaxed, assuming a flat which favours its dilata-
tion in the act of parturition.
The vital properties of the uterus, as well as its organiza-
tion, are considerably altered after conception. The organ 
acquires unusual liveliness; hence they 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 caesarean 
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 its 
strong 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 ute-
rus, at which this contraction may not be excited by the 
action of particular causes, which, under certain circum-
crances, 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 passion 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 disturbed, contracts, 
and abortion ensues. This contractile power, with which 
the uterus becomes endowed on the change of its organiza-
tion, partakes of the characters of animal contractility and 
of irritability. The inactivity of the uterine parietes, until 
the termination of utero-gestation, resembles, in some re-
pects, 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 those muscles. On 
the other hand, the contractility of the uterus is independent 
of the cerebral influence, and its exercise is absolutely invo-
luntary; this circumstance particularly characterizes irrita-
bility in those organs which possefs it in the most remarkable 
degree, as the heart. Like the latter power, it may be symp-
pathetically roufed, when the action of the uterus is suf-
pended 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 follow-
ing 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, 
it opposition is diminished, and it then gives way to the con-
tractions of the body and fundus. Against this explanation 
we may urge that the supposed struggle between two op-
poing 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 aid in the operation; and hence partur-
tion 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 abdo-
nominal muscles is not so indispensable, that the uterus can 
get rid of its contents without such aid. We know the ex-
traordinary facility with which parturition takes place in 
some women, who, in consequence of particular circum-
crances in their condition, exert themselves even to retard 
the process; and the expulsion of the child is sometimes com-
pleted at the approach of death, when the abdominal mus-
cles 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 gra-
dually reduced in its bulk. For a short time its parietes 
are in a state of increased thickness; the vessels, being com-
presseed 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 re-
moved.

**Phylogy 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 
35 years); which, from the periods or returns of the dis-
charge, is called the menstes or catamenia, and, from the 
general regularity of its appearance, is termed in French les 
regles. The commencement of menstruation is coeval with 
that equal revolution in the female constitution, which in-
dicates the power of executing the generative functions, and 
may be regarded as the development of the sexual life. It is 
therefore one of those circumstanes which, taken altogether, 
mark the period of puberty in females. At the same time 
their complexion is improved, their countenance is more ex-
pressive and animated, their attitudes graceful, and their 
conversation more intelligent and graceful; 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 pastimes and 
amusements. These phenomena have been described very 
elegantly by Harvey: "ne minus notum est, quam virgo 
acerrimo contingat, inrecreante primum et tepefacto 
uteris; pudefit nempe, coloratione oculit, mannae prae-
truant, pulchrior velutum ridet, splendent oculi, vox canora, 
inceput, gellus, ferro, omnino decoris sunt."

The whole human race is subject to this law, and the ac-
counts of some travellers, stating that the Brazilian or Sa-
moied women are exempt, have not been confirmed by more 
recent
recent and accurate inquiries. It is a general and essential phenomenon in the life of woman, and if different climates, or the varieties of the 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 the 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 supposed to be in an impure state, and to communicate a malignant influence; they are consequently compelled to flum society while the discharge lasts, and to avoid the sight of man by hiding themselves in solitary huts. Travellers have also observed that their curpulous attention to personal cleanliness, and to the modest attitude of the lower extremities, would prevent the spectator from discovering any traces of the catamenia. The discharge is peculiar to the females of the human species, whereas, in the language of Pliny, it is the only "animal menstruate." 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 supposed catamenia did not exist at all in some, while in others there was a small occasional uterine hemorrhage appearing at no regular intervals. (Institut, Physiol. 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, to give rise to the erroneous notion of their being subject to the menstrual flux. Such a casual and unfrequent 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 menopause 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 exercise has a different object and direction. Pregnancy almost invariably interrupts the process. 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 ejaculation of the discharge without the presence of any unhealthy cause, is the only gap 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 menopause 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 disposed to, or requires a fangmous discharge, it is commonly made from the vessels of the uterus.

The early or late appearance of the menopause 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 menopause appear. In Greece, and other warm countries, girls begin to menstruate at 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 southerly countries of Europe, and later as we approach to the north. According to Linnæus, in his "Flora Lapponica," the women of Lapland do not menstruate until a mater age, and then in small quantities, at long intervals, and sometimes only in the summer. But if the process 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, lying 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 less estimation. In hot climates, women are at the height of their beauty when they are full children in underlining; and when their understanding is matured, they are no longer the objects of love. In temperate climates their persons 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 menopause. 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 last 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 fifteen 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 menopause 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 catamens, with powers of fecundity, have continued in particular instances much beyond the age we have specified. Some of these have had regular catamens; 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 menstes accidental and morbid hemorrhages. A relation of Haller's has 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 for many months, by a whitish ferosus fluid. Symptoms of more or less violence, indicating the accumulation of blood about the hypogastric vessels, such as pain in the loins and about the pelvis, latitude with painful affection of the lower extremities, and various nervous and hysteric feelings, are then observed. Pains in the head, flushing of the cheeks, and even simiply appearance in the face sometimes take place. In danger begins these symptoms are milder, and in the different instants often go off spontaneously: but they return with greater intensity, attended with considerable colic pains, and quick and strong pulse, until a bloody flux, 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 warm 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. Dennan, 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 alternation 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 ferosus 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 from one month, and this period approaches gradually to a full month; 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 catamenis, there is an interval of twenty-two or twenty-three, making up the menstrial period. Such is the course observed in healthy temperate females, whose bodily and mental powers are not abused or overstrained. Improper regimen and manners may precipitate or retard the discharge. Luxurious manners, with high living, may occasion return after fifteen days: under various other circumstances there is a similar protracion 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 discharge 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 distilful the two fluids; viz, that the catamens do not coagulate. They are blood deprived of fibris. Coagula are sometimes seen, but are considered to denote unhealthy menstruation, 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 pollutes some peculiar malignant properties. Thes 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 expessions used, the disposal 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. "Painis cum menematur facultas concumbendi excisatur; si novella vitis coagatur, in perpetuum editerit; iteriles hunt tactae fruges; moribundit in ultimatur; exsuntur bortorum germina; haller praeidam alterius menstruum supergregidant, ant illis circumstius, abortum facit; inamet, quia utrocrucia, conchiplum seidem inopia; pargant simпитur, et vaporab o arcepe etatae chronic obsura obturat. Gratus hic sanguis eases in r obedient, homines vero diris cruciatibus abigite; comitabant morbum, pilarum effluvium, aliaque elephantiocrum vita inducat; idcirco a veteribus inter venena relatus; peri malignitate exsuntur, atque sanguinis elephantiocr potus." 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 acuminious 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 circumstians already mentioned. Nay, when the catamenis are retained in the body for 24 months, in cases of imperforate uterus, the discharge produces so ill effects, whatever, and are distinglished by so 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 insufficient nature.

That the catamenis come from the uterus is tolerably evident from the change in the lining of that organ during the period of their flow. Its mucous surface is rendered lofter and more viloinous: and exhibits bloody spots, with numerous pores, from which the fluid may be expelled. The appearance of the menstrial blood in its cavity during the period is a further proof: to which we may add the suppuration 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. These arguments we may add the obvious connection of the menstrial flux with the functions of the uterus. Some have contended that the vagina is partly or wholly the source of the catamenis; but the opinion rests on no sufficient ground: the structure and function:
functions of the vagina, as well as the direct evidence of facts, strongly oppose the opinion.

Whether the menes come from the arteries or veins of the uterus has been a point of discussion with physiologists; and also whether it be a simple efflux of blood from the vessels or a secretion. The structure of the organ refembles that of glands, and the appearance of the fluid, on many occasions, differs widely from mere blood; which indeed it never resembles 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 any other glands. A circumstance is sometimes observed in this process, which must be referred to the secretory action of the uterine vessels. This is the discharge of the membraneous substance, of the figure of the uterine cavity, smooth on one surface, and flocy on the other, and much resembling the decidua on the whole. This fact is mentioned by Dr. Dinsen, who first saw it in married women, and afterwards in unmarried ones under circumstances which proved undoubtedly that it was formed independently of connubial 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 fiction, 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 show that there is no day of the month in which fever do not begin to menstruate, and that the moon's apogee or perigee 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 solar time, 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 intertine motion in the vessels of the part, meets now with no advocates. Local or general plethora have been assigned as the reasons of the menes, and many of the circumstances which accelerate or increase, or on the contrary retard and diminish the flow, favour these opinions. But we will not 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 menes; 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 obstructed menes; viz. that their place is supplied by periodical emissions of blood from various other parts of the body, as the mouth, 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 observed to be periodical.

That the catamenia are a secretion from the mcosa 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, seems to be nearly the sum of our knowledge on this subject. It is clear that the process, being a part of the healthy operations of the organ, and therefore indicating its general condition, is necessary to prevent the uterus in a state fit for conception. Observation has fully proved that women, who do not menstruate from the uterus, or who are tending in a state fit 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 fabulous, 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 seasons and climates, becomes sanguineous.

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 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 animals, proves that they are in a state favourable to the propagation of their species, and the catamenia prove the same circumstance in women.

From the time when the phenomena 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 beffows on woman the most striking traits of her physical and moral character. The various revolutions to which her constitution is subjected, 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 male 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 recalls woman to her sex, and marks her whole existence with fo characteristic a physiognomy. We shall not be surprized 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 just 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 furor uterinus. Generally, however, this excessive vitality of the sexual organs, without going to such an extent, produces various spasmodic and nervous symptoms, constituting what are called hysterical 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 deraigned 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 cloister, present us with an alarming catalogue. "Ut reliqui illiuti a natura dati inobsequi os punitum, ut et venerem abscissiam, ut nature imbecillam, hee ipsa uilecticur. Ipsa animalia ex defiderio veneris languentur et pereunt. Cyprini eex retentis ovis laborent. In facris edibus, de quibus fere religio venerem arcet, multa, parum cognita, neque famabilia morborum genera vigere idoneus auclor exsultat. Frequentem ex potilium, quae veneris dulcedinem deglutintur, quae nunc privatum, in chlorophy, in hylterica mala, in conjugatione, ..."
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The generative process is subject to very different laws in animals and in the human species. In the former, particular seasons 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. Most animals, and particularly birds, copulate in spring; and that warmth 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 it stimulates, 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 instability of this process. These latter contend for an absorption of this fluid by the vagina, and a peculiar excitement of the whole frame as a 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 seen 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 eminated termination of the tube; and when at this last, 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 factus 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, De 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 subtile fluid in a vaporific state, called aura feminina, and that the contact of this vapour is sufficiently to impart to the ovaries their due quantity of stimulus.

The opinion, that the presence of the semen in the vagina alone was sufficient to account for impregnation, was defended by the statement of cases, 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 cavil 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 cornua 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 found side. If the former bodies are produced only after conception, which the doctor affirms, then conception must have taken place here, although the direct access of semen to the ovary 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 shewing 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 deferred until the time at which the rudiments of the new animal have passed into the tube, the actions of the parts suffer 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
flaps 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 femen first stimulates the vagina, os uteri, 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 the formation and growth of the fetus. And, by sympathy the breasts furnish milk for its support after birth.

Phylogographers 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 amphibians, as the frog, newt, and toad: and afterwards in the bitch. He experimented on a spaniel bitch, which had before had whelps. He confined her very closely till she was in heat, and then proceeded in the following manner: A young dog, of the same breed, furnished me, by a spontaneous emission, with 10 grains of seed, 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 polite, 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 set 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 male, and one female, resembling in colour and shape not the bitch only, but the dog also from which the feed had been taken." (Dissertations, vol. i. p. 250.) The experiment was repeated with success by Dr. Ross, 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 furtbicles were perfect, but the femen always passed out at the perineum. The late Mr. Hunter was consulted to remedy, if possible, this inconvenience, and to enable the person to beget 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 femen. 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 fibrillor dentium, &c. Haller's sensible remarks on this subject seem to us to be nearer the truth. "Hec omnia quidem nibhi nusia videntur, et difficiliima expertv. Neque enim feminia, dum maritum admissit, ottio eff ad experimentum animo: neque, nisi longo abhinc temporae nusit fore se concephile, quando dno ejusmodi phena de memoria clapa fuit. A feminis certe, a quibus verum poteram expectare, nihil de horripilatione, neque de dolore potui difceere." 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 lascivious women, or such as live luxuriously; it confines merely of mucus, 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, consequendy, these have been investigated in various animals. Mr. Cruickshank gives the following description of the parts of a rabbit at heat. The orifice and internal surface of the vagina are as black as ink from the great deternination of blood. The ovaria had, under their external surfaces, a great number of black, round, bloody spots, somewhat less than mulberry-seeds. These black spots are the calcies or cups which secrete the ovum; they are extremely vascular; the ovaria themselves are transparent, and carry no visible blood-vessels. These calcies, on the expulsion of the ovum, enlarge and become yellow, projecting above the external surface of the ovaria, and form the corpora lutea: a certain mark of conception in all quadrupeds, and in women themselves, whether the embryo is viable or not. The ule 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 lacertated parts usuall
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usually have. The Fallopian tubes, independent of their black colour, were twisted like washing worms, the peristaltic motion still remaining very vivid; the fimbric fibers were also black and embraced the ovaria (like fingers laying hold of an object.) so closely and so firmly, as to require no 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 so until a later period. He examined a female rabbit in high season a few minutes after coition, and found the fimbric 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 fimbric remained nearly in their usual situation; and the only difference he noticed in the half hours was a greater turgescence of vesi,

fs if preparatory to some important act. That the prominent vesi or calyces of the ovaria, already mentioned, burst, and allow something to escape into the Fallopian tube, which conveys it into 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 ovaria calyces, and consequently, as exhibiting incommutable 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 process have not been traced. Observers by no means agree as to the time at which these changes are effected. Mr. Cruikshank represents the bursting of the calyces as following a fruitful coition very speedily. "I opened," says he, "a female rabbit two hours after she had received the male: the black bloody spots just mentioned now projected much above the surfaces of the ovaria, some of the ruptured orifices were just visible; but in many of these spots there was not the least veilage 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 ovaria calyces does not take place till a much later period. In twelve hours after coition "several of the vesi evidently projected; they had lost their transparency, and were become 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 vesi, were not very evident." At 24 hours after coition the fluid in the vesi was similar to that of the late 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 vesi seemed to be in the very act of bursting, and a semi-transparent substance of a mucous-like consistence was beginning to protrude from some of them; others, indeed, were less advanced. The limbrated extremities of the Fallopian tubes were preparing to receive their contents, as appeared by their having quitted their usual position, and embraced the ovaria in such a degree, that only a small portion could be seen until the tubes were taken away. Sections being made into the thickened vesi, the formation of corpora lutea appeared to have made rapid advances. From the appearance of an incident rupture of the vesi in this experiment, it was but reasonable to expec
t that their contents would soon have escaped. In two days and twelve hours after coition the facial rudiments had escaped; but the cavity of the ovarian vesi had suffered but little diminution. Brillié were easily introduced by the ruptured orifices. In this experiment the advances to-

wards the formation of a perfect corpus luteum were such as the period of examination would naturally lead us to expec

t. The contents of the vesi having escaped, it was but reasonable now to look forwards to a speedy obliteration of the cavity. I therefore examined these parts, under similar circumstances, on the 3d, 4th, and 5th days. In the last experiment there was but little veilage of cavity, consequently the corpora lutea might be considered as perfectly formed."

That a somethings which is the germ of the future animal, and is supposed to be of a vascular figure, escapes from the ovaria after conception, is received into the Fallopian tube, and conveyed by it into the uterus, is rendered highly probable by the facts just related; and various additional proofs may be adduced on this subject. Almost the whole human kingdom poifefs ovaria, in which the rudiments of the future being are obviously contained previously to impregnation; and it is the development of these rudiments after impregnation that forms the future animal. The formation of the germ in the ovar, and its passage into the ovum, are particularly clear in birds and reptiles; and analogy strongly leads us to assign to the ovaries of the mammalia the same function of producing these germs. The removal of these bodies renders the woman completely sterile; and Mr. Hunter has shown that the extirpation of one has a very marked effect on the fecundity of the animal. In the Philosophical Transactions for 1787 he has detailed the result of "an experiment to determine the effect of ex-irating one ovarium on the number of young produced." He selected two fows of the same colour and size, and one boar from the same fowc, and removed one ovarium from one of the fows. About the beginning of the year 1779, they both took the boar; but the one which had been spayed earlier than the perfect female. The distance of time, however, was not great, and they continued breeding at nearly the same times. The spayed animal continued to breed till Sept. 1783, when she was six years old, which was a space of more than four years. In that time she had eight farrows, conRitting of 76 pigs; but did not take the boar afterwards. The perfect animal continued breeding till December 1785, when she was about eight years old, a period of almost six years, in which time she had thirteen farrows, conRitting of 163 pigs. "From this experiment," says Mr. Hunter, "it seems most probable, that the ovaria are from the beginning defined to produce a fixed number, beyond which they cannot go, though circumstances may tend to diminish that number; that the constitution at large has no power of giving to one ovarium the power of propagating equal to two; for, in the present experiment, the animal with one ovarium produced ten pigs less than half the number brought forth by the pig with both ovaria. But that the constitution has so far the power of influencing one ovarium, as to make it produce its number in a less time than would probably have been the case, if both ovaria had been preferred, is evident from the above recited experiment." Certain irregularities in the process throw much light on the subject, and tend to strengthen the argument just adduced. Fetus may be detained in the ovarium, and develop itself to a certain point. Or, the germ may escape from the ovarium, and not be admitted into the Fallopian tube; in which case it has often become attached to some part of the abdominal cavity, instead of the uterus, constituting what is termed a conotal extra-uterine fetus. After it has attained a certain degree of development, labor pains come on, but parturition cannot be effectecd; and the bones of the child are, perhaps, discharged through an abces, or gain admission into the alimentary canal, and are

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voided per annum. Lastly, 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 bursts, in general, long before that time, and the patient perishes from bleeding.

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

We have represented 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. Valerier aetists, that he has seen corpora lutea in the ovaries of virgins; and Blumenbach appears, in the following quotation, to agree with him in opinion on the subject.

"Porro ova ovium minus verum est inexputas aves ejusmodii ovum: ut feminae ex machinica titillationi genitalium concinere posse, quod quidem physiologic dispersarum Aristoteles, et pretecto seculo octoanticifimus Harveius animadvertit, quorum hic adaebo libidinosissimus interdum aves efferent, ut si dorsum curam manu folum leniter tangas, siiinam procurant, et orificium uterinum nudent et expirragint, quod si blandite digemelis, vago mormare, alarumque gefcillatione, gravem veneris dulcedinem easdem exprimere; quin etiam femellas ovum inde concinere, in turdo, merula, alioque efeo expertum. Idem de pappaco referat, quem uxor ejus diu in delitis habuerat, ferpe hunc ludibundum et lascivum fedentis greylum adiefe ubi dorsum ibi demulceri getluerit quasfifque aei et blandie firepitum hymnum animi sui lietiam teftatus fuerit. Non diu autem poti blandas has contrectiones eumdem aggradation, cerbrique tandem coavulsionibus obortis exsiprallae. Difficile itaque cadaver ovum ferre perfectum fe in utero ejus reperirei; feb, ob defectum maris, corrossum. Ignominious mares itarum virginitis, si luteca in carum ovaris corpora non absumilem originem agnosiee fupicor; utpotfe qui in pelliculo corpore, non minus quam in turdis et merulis eundem acti venirei in ovarii veiculis effectum esse reor, sive iis amplexu, sive lebico quandum artificio excitatus. Quadrant in fam scopicationem, qusx dominus circumstantiae, fab quisque corpora lutea in inexpitas obseruant noactores; etas feliicet, a decimo quarto ino anno, lyterica quamdam affectio, &c. Num climati quoque aliquid tribuenatum, decedere non male, annotans tantummodo, quoquin huius artesius apud noactores occurrexunt ejusmodii hard inficiantibus causis, eos non nisi in Italiciqve virginitus observatris suae." — Specimen physiologic comparare, Gottingae, 1769, p. 4.

Physiologists have questioned whether a second impregnation can take place after a fruitful copulation. Influences of twins, born with different degrees of development, have been considered as proofs of superfection. The reasoning does not seem very conclusive, the fact does not clearly prove that the two foetuses 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 American 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 paragraph, the reader may refer to the ample collection of facts, in the eighth volume of Haller's Elements; to Spallanzani's disquisitions 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 foetus; 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 persons 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 ingratisimii mihii impendat opus, scribere de his, quse multis a natura circumventis tenebris velata, fenfuum loci incomprehensum, hominem agitantur opinionibus; erit de is ferenda tentantia, in quibus quod dubitasse, quod infirmum sit, ubique fe offert, id autem parciillme, in quos animas, tanquam in firma aliquo fundamento, adiacet. Erunt libranda cum phemenonem contraria phemenonem, cum argumentis contraria argumentis, ut demum nihil doceam certius, quam nihil me docere. Et eft tamen etiam in desperatione de problematis solutione futur utilitas, proximamque eft vero, nihil docere, quod faltum fiet." The first subject of our inquiry will be, from what quarter the materials of the new animal are derived; then, by what causes these materials are formed into an animal, such as we have been 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 foetus, 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 stimulating engine, to call the latent powers of the female into life. The third gives not pre-emience to either sex, but, with the mutual embrace, supposes a mutual effect to be produced; it regards both the male and female, as concurring essentially in the work of reproduction, by each affording something, which, when united under proper circumstances, becomes the proximate cause of impregnation.

The ancients admitted a femal liquor in both sexes, and concluded, not unnaturally, that the foetus 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 obscure 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 foetus, 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 duii, and the perpetual preference of the seed before fecundation; which, however, remains unfruitful without the influence of the former. The refemblance
blance of the foetus 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 tefts and right ovaey, and are contained in the right side of the uterus, while females are formed on the left, is delusive of all foundation. A male with one tefts has produced children of both sexes; and male or female foetuses are seen indifferentiy in the right and left corners 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 recompenses us very imperfectly in scientific matters for want of observation, and hasty generalizations; and the theory of Buffon is so delusive 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 inferior 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 telicules of each sex, which are its reservoirs. 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 compounding the new being are analogous to those of all parts of the body, from which they have been conveyed to the telicules, 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 chimeras; they more than justify the sarcasm of Voltaire in his "Homme aux quarante ecus." "Ah! monsieur le favant, says the man aux quarante ecus, could not you inform me how children are made? no, my friend! replies the favant; but I will tell you what philosophers have imagined on this subject, or, in other words, how children are not made." This jeu d'esprit 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, Leeuwenhoek is the foremost. He considers the spermatic vermiculi 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 foetus is produced by the mother has been more generally supposes; 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 toad, and in the bird, it is very clear that the foetus pre-exists in the ovary; and that the contact of the semen 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 toad would lead us to conclude that I cannot excite any very great change at the first moments of its application; and this circumstance, together with the obvious existence of the sometbing, which is afterwards evolved into a tadpole, in the ovarium before copulation, clearly proves the pre-existence of the germ in the females of this species of animals. "A quantity of feed," says Spallanzani, "far more inconsiderable than we should ever have imagined, is sufficient to animate a tadpole. We have seen that it is not necessary to cover the foetus completely with this prolific fluid: a drop will suffice. Further, three grains mixed with twelve, and even 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 feed must therefore have been diffused through the whole mass of water. But what an enormous division of its particles must such a diffusion 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 1/50th of a line in diameter, taken out of a mixture of three grains of feed with eighteen ounces of water, was often capable of fecundating a tadpole. Depriving of the proportion, which the tadpole (that of a frog is 2-3ds of a line in diameter) bears to the particles of feed diffused in a drop of this dimension, I have found, on calculation, that it is as 1:64:7777777 to 1. How infinitely small, therefore, is the quantity of feed in comparison with the bulk of the facts, which it fecundates! This deduction led me to calculate the weight of the particles of semen diffused in this drop of water: it is 1/78864, or 1/8 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 7777777 of a cubic line." Differtations, vol. ii. p. 212. The researches of Haller, and of others on the formation of the chick, have clearly proved the pre-existence of the factus 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 resembile the parents in the human race; so that you may distinguish one brother by his resemblance to another, or know a man by his likeness to the father or mother, or even grandfather or grandmother. All the individuals of some families are characterized by particular lines or countenance. My own family have now been distinguished for tallness of stature for three generations, without excepting one out of many grandfathers descended from one grandfather. Families of red-haired persons are not uncommon: the disagreeable colour being derived from the father or mother or grandmother. But this resemblance of children to parents is dependant most plainly when there is any defect or peculiar formation transmitted from one to the other. The transmutation of diseases may perhaps not be deemed so surprising, since nobody denies that the masts of fluids is derived from the mother; but the father contributes the smallest drop possible, if any. Yet we find various diseases, or dispositions to diseases, passing from either parent to the offspring. This is matter of common notoriety with respect to gout, rheumatism, insanity, scrofula, consumption, &c. but there is more doubt of some others, as cancer, hernia, aneurism, squinting, harleips, clubfoot, faciety, &c. of which, however, authors relate many examples. We know a very remarkable instance of two noble females, who got husbands on account of their wealth, although they were nearly idoits, and from whom this mental
defect extended for a century into several families, so that some of all their descendants fill continue idiots even in the fourth and fifth generations. Perhaps the resemblances of the mother are rather the most common. The ill-made Per-rians 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 their general form, those 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 black, clack, cylindrical, warty excrescences, begot sons and daughters with the same deformity. An excess in the number of thumbs (four) parted from the father to the children; and there are curious examples of similar facts in individuals possessing five fingers on each hand. Pliny mentions that Q. Horatius, who had this birture, begot two daughters resembling him in this respect. A family mentioned by Reaumur 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 appeared 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. Maupertuis has also recorded a family of children distinguished by this character, produced by a mother with the same peculiarity. The thick lip in the Austrian family was introduced by the marriage of Mary of Burgundy with Maximilian. It is ascertained that such muta- tions, as blindness, &c. have been transmitted to the offspring, in horses; and from the plan of employing Arabian stallions rather than mares for improving the breed. There is a peculiar breed of four-horned sheep, descending 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. Foals 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." Elements of Physiology, lib. 29, sect. 8.

The phenomena afforded by hybrid generations are curious. It is only in the cases 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 re- lations of women in Africa breeding with monkeys are not sufficiently authenticated. "The mule (produced from the mare by the ass) does not," says Haller, "seem to me to be an ass, which however it resembles in its tail, ears, and obstinacy, 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 further resemblance of the ass in the peculiar hollow of the larynx. As the mule seems to be stronger and more lively than the ass, so the high begotten by the stallion on the thr-er, seems rather to follow the mother: it is said to have the ears of the horse, the mane and tail of the ass; and to be smaller than the male. The offspring of the common he-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 fliture 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 ass; and it is further known that this animal, and all other hybrids, very rarely propagate: so that we may con- clude 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 defend, 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 semen have been already noticed; he even admits the formation of new beings by putrefaction and by the fortuitous concourse of particles. His associate, Turvilliere 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 germs 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 possessing any lineaments of the animal. Hence the smallest animalcula, as consisting of the fewest germs, are formed the soonest; and those of a more compound structure, more slowly. The whole affair of vegetation consists of an expansive force relying in matter, and a retarding power. The former is perfectly elastic, and exerts
in every sensible point of matter; it is ascribed by heat. There is a power, in every point of vegetable matter, to produce filaments, from which microscopic animalcula may be formed. A real generating cause 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 seminal fluids, both of the male and female, characterized by their peculiar properties, should be present.

In this hypothesis the power of the fermen is not neglected, nor is any attraction or fortuitous confluence of atoms admitted. But the experiments on infusion animalcula 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 animalcula designed for certain purposes, and sit to fill their place in the chain of beings. Hence we find that these animalcula 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 system of epigenesis met with an able defender in C. F. Wolf; see his Theoria Generationis, Haller, 1759, 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 vis effentiales, without any mould or model. This power, together with the fixation or coagulation (futia defecentia) of juices, 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 24 hours. The vis effentiales, different from the power of the heart, now begins to act; and, in the globular matter of the area umbilicalis, forms grooves, which gradually grow red, and constitute vessels. These at first are large intervals of the globular matter, but gradually become smaller. Membranes are formed round these passages. All parts are first fluid and inorganic, and then formed into vessels. Trunks are formed in 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 succession, 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 homogeneous mass. The transparency of the whole prevents the outline and distinction from being visible, but conglutination 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 viliers, where there seemed at first to be a mere transparent concrete.

There is no essential 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 affirmed but a dilating force acting progressively; this might give origin to a vascular 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 so directed, that inorganic materials are formed into bones, muscles, vessels, and viliers, 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 successions of layers, all differently fabricated, where the light pâtes through transparent bodies, every where surrounded by others perfectly opaque, and so arranged, that in the millions of men and animals the rays of light constantly converge on the retina? Yet this blind material cause 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 to be formed in them, as in an internal mould; and he conceives that the superfuseful particles are carried back to the semen, conveying into that fluid every thing necessary to the production of a new being, similar to the former. The seminal fluid of either sex contains the particles necessary for forming an individual of the same sex. Thee must be mixed for the production of a new being. The generative organs are the baits 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 confine we could not understand it, 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 asserting 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 see the source from which the foramen ovale, the ductus arteriosus, and venous, the
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The umbilical vessels, the placenta, the cord, &c. are derived. The teeth too must puzzle us greatly. The various trans- formations, and every other phenomenon in the lower orders of animals, are altogether incomprehensible 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 caterpillar differ, in all points of its organization, from the butterfly? How can the particles 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 successive fixation of parts round the generative organs is quite inadmissible; 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, physiognomy, measurement of the limbs, &c. they resembled each other completely. Inhabit. Physiolog. P. 387.

In reply to some of these objections it has been affirmed, that those parts of the fetus, which the parents have not, are formed by intelligent nature from the superfluity of the organic molecules; that she adds a second telific from 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 nutritious molecules; but if nature can make wings, intestines, nerves, feet, telels, placenta, membranes, &c. without any mould, why should not the main body in the same way: and, whence arises this abundance of particles, produced by the tefts 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 human 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 seen, nor corpus lutenum beforecopulation, 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 manse and the other distinctions of the female sex.

A very different theory from that which we have just considered, and a very old one, ascribes the formation of the fetus to a formative power of the mind or soul (anima structrix, vis platica): 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 structrix 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 endless examples of the most vehement mental disturbances, as terrors, 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 forget when the marks above alluded to (nuxis) will appear. Deformed and monstrous children, and others marked with nuxis, 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 circumstance being considered as extraordinary or requiring anything 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 feeling any uncommon animal, the carcasse of a beaf opened, or a wound, &c. they immediately set it down as the cause of the phenomenon. And, from the various turns which superflitious 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 adopt the common notions about nuxi much less than others. In the numerous collections, where monsters and extraordinary productions of all kinds are carefully collected and preserved, we find no example of a genuine nuxus, according to the common notion, that is, of the resemblance of a fetus, or of some 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 seed 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 phenomena of nuxi 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 to far perfected as to require merely a supply of nourishment for its growth, the grand difficulty of forming such an artificial and complicated structure from inorganic matter is overcome. In this hypothesis, the Creator, with
with whom nothing is difficult, forms the machine: he has arranged dead matter, in conformity with his previous designs, and according to the archetype fixed by his wisdom, before the accession of the influence furnished by the male. In the same way you may in plants a perfect flower, capsules, 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 added 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 differentiated by the removal of the skin, and have its parts unfolded. The rudiments of the organs, which are to contain air in the bee, exit in the fatty fulness 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 more unorganized mass, Lavoisier already discerned, by means of his microscopes, did three generation. Thus it is manifest that an animal without any limbs, or discoverable arrangement of parts, is gradually changed by various stages into a perfect being, nourished by food, and susceptible of voluntary motion. It may be inferred, whether the animalculae, before it can be recognized by the senses of the dissector, exits in the father or the mother: whether it were formed by epigenesis, or the successive union of particles; or suddenly produced. Epigenesis is altogether impossible. 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. Vicera must accompany thef, 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. Muscles must have been present from the first: for the young animal, in the incubated egg, is capable of motion, and from its first flat blade bends the body. It is moreover irritable, and must consequently have muscles, although they are concealed under the appearance of a mere gelatine. The heart is large, and the eyes are visible among the first parts, together with the heart. The muscles 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; that nothing now 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 ovari of Eve; a proportion of so far a nature, and so completely un- susceptible of proof, 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 ovarian receptacle, were it not stimulated by the

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fitted 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 material form has been preserved 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 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 in conflict with the phenomena, and in the rules of philosophizing, 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 proceedings 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. 1. 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, whole existence and agency can be the least questioned, is the force which acts on organized matter, when prepared for its definition, but not yet moulded into shape, and bellows 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 nihus formativus. 3d. This nihus formativus is imparted to the materials of generation, when they are contained in a mature state, under the requisite conditions, in the uterine cavity, builds up in it the rudiments of the embryo, and gradually forms its organs to correspond to their pre-ordained purposes; it perfects the same structure by the processes 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 those, 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 case in the vegetable kingdom, with some simple aquatic productions, as the conca repitalis, which is propagated in the early part of spring; in the bloodclots divisions of the animal kingdom, with the polypes (hydras); 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 nihus formativus is employed simply for the purpose of distinguishing this from the other kinds of vital powers, and by no means with any intention of explaining the cause of generation. I believe the latter to be concealed by no less impenetrable darkness than that which involves the causes of gravitation and attraction; and which are only names for effects, recognized like the nihus formativus, a posteriori. I have employed the word nihus 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 births of generation. The very point on which the whole of this doctrine concerning the nihus formativus hinges, and which alone sufficiently distinguishes it from the vis praecipitata of the ancients, the vis centriales of Wolf, and other hypotheses of the like nature, consides in the combination of the two principles, by which the nature of organized bodies is explained, viz. the physico-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 nihus 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 assistance of the excellent modern dioptrical 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 recount at greater length those arguments drawn from nature herself, by which the influence of the nihus 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 parental hybrids, fecundated during the various seasons, 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 swine, 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 monstralties must have existed in the germ from the first creation of things. The phenomena of re-production, taken altogether, can be much more aptly explained by the agency of the nihus formativus, than on the notion of pre-existent germs; and some particular examples, as, for instance, of nails growing on 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 affume 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 affinities of the nihus formativus; while the latter sufficiently explains the phenomena of generation, without the aid of pre-existing germs. Whatever theory of generation we adopt, we 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 Cyclopaedia which relate to the subject of midwifery.
GEN

GENERALITY, 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 rofe, 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 explaining the bad generic 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 generic 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 copious adherence to the customs of their predecessors, seem to have been principally the causes of this, and often an entire negligence. Artedi’s rules for generic names for fish are these: whatever fish there are which agree in the same generic characters, and are properly of the same genus, these ought all to be called by the same generic name, their differences being only expressed by specific ones. This appears to plain, to just, and to necessary a rule, that it is almost 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 improbity in the generic 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 judge, 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 abolidished, 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 generic names that are composed of two whole words, unnaturally tied together, are to be abolished, it being easy to contrive names less barbarous, and as expressive: next to these are to be exploded these names which are formed of two generic words before in use, the one broken or cut short, the other preserved 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, which with which we find the books of authors of former ages on these subjects crowded.

A fifth rule for the regulating generic names is, that all such are to be abolished as terminate in iodes, 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 when 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 rhomboidei, scorpoidi, &c.

A seventh rule in regard to these names is, that all such are to be rejected as are barely diminutives, and terminate in ulus or us. These convey no other idea but that of the fish being like some other fish, only less: now bignes is no generic character; therefore if this genus, and that re-
ferred to, differ only in size, they have no general differ-
ence at all; if they do differ otherwise, they should be
expressed. What makes many of these names also more
intolerable is, that they allude not to fish, but to other
things so different in their nature, that there must needs be
many other more effcient variations between them, before
size.

Another general rule is, that such general 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 formed
by the latter writers, are to be expelled as barbarous, and
others of better credit placed in their stead.

Finally, such general names as have been given to fish
from the places where they are caught are to be rejected;
the name that is the ferdelis and fardila from the island of
Sardinia, and the furio from Asturias, a province of Spain.
The fefs of names can convey no idea of the nature of
the fish, and may belong as well to one genus as to another.

Arded, Ichthyolog. p. 106, 69, 73, 79.

These rules of profession banished to many of the receiv-
ed general 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 expressed, and the few remaining
may be best denominated by compound Greek words, ex-
pressive of their real characters.

Among the true and genuine Latin, and Graeco-Latin
names of the genera of fish, are these: acipenser, amia,
antias, batzena, blemius, clupea, cobites, cyprinus, del-
phius, elops, eels, eocetes, gobiini, labrus, lamia, lipa-
ris, mugil, mulius, murana, perca, phylter, pristis, raja,
falmo, falpa, scarus, scobomer, silura, sporus, squamus, thyn-
nus, torpeado, triton, turbo, uranocopus, xiphias, zeus.
These will go a great way toward the naming of the true ge-
extra, and which he has laid down,
specific names of fish; 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 know-
ledge he has occasion to write.

GENERALIS Secondi. See Secondi.

GENEROUS, a Gentlewoman. See Gentlewoman and
Spinster.

GENEROSITY, Order of, an order of knighthood,
established in 1685, by Frederick III., elector of Branden-
burg and king of Prussia, whilst he was electoral prince.
The badge was a gold cross of eight points enamelled azure,
beading in the centre this inscription "LA GENEROSITÉ;"
and pendant to a blue ribbon.

GENESAN, in Geography, a town in the Arabian Trak;
90 miles S. of Bagdad.

GENESAR, or GENESABETH, called also Chalres, and
afterwards Tiberias, a town of Palestine on the lake of the
same name, called also Sea of Galilee, which fee.

GENESEE, a township of America, in the state of New
York, and county of Ontario, having 217 electors.

GENESSEE, a county, a large tract of land in the state of
New York, deriving its name from Genesee, one of its rivers,
and bounded N. and N.W. by lake Ontario, S. by Penn-
sylvania, E. by the western part of the military townships in
Ondago 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.

GENESSEE, or Genesee River, rises in Pennsylvania, near
the most elevated spot of this state, where also the cfferent
water of Alleghany river, and Pine creek, a water of Sus-
quehanna, and Tioga river rise. It has several falls, which
furnish excellent mill-feats, that are improved by the inhab-
itants. After a course of about 100 miles, chiefly N.E.
by N., it discharges itself into lake Ontario, 43 miles E.
of Irondequay, or Runaghat bay, and 80 miles E. from
the falls of Niagara. The settlements on this river, from
its mouth upwards, are Northfield, Northampton, Hart-
ford, Genesee, and Williamburgh. When the western can-
als and locks are completed, there will not be any carrying
place between the city of New York and Williamburgh.
The Genesee flats lie on the borders of this river, about
20 miles in length and about four in breadth. These are
probably the isle of the Indians.

GENESSEE, or Genesee County, is bounded N. by lake On-
tario, W. by Niagara river and like Erie, S. by Pennsylvania,
and E. by the counties of Tioga and Onondago. It com-
prehends the counties of Ontario, Steuben, and Genesee,
and contained, in the year 1800, upwards of 17,000 per-
sons. This county is finely watered by the Genesee 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 county 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 Pen-
tateuch, which fee. Its author is held to be Moses: it contains
the relation of 2369 years, viz. from the beginning of the world
to the death of Joseph. The Jews are forbid to read the begin-
ing of Genesis, and the beginning of Ezekiel, before thirty
years of age.

The Hebrews called this book Birshebith, because it be-
gins with that word, which in their language signifies in
principio, or in the beginning. The Greeks gave it the name
Genesis, praxeis, q. d. production, generation, because it be-
gins 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 re-
formation of the world; the division and peeling 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 delivers in this book, because it came down to
him through a few hands; for from Adam to Noah, there
was one man, viz. Methufelah, who lived so long as to fee
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.—Pa-
trick.

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

The genesis, 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 extreme thereof to the other, called
its axis, or axis of revolution: the motion or revolution
of that semi-circle is the genius of the sphere, &c. See GLOBE and SPHERE.

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

GENEST, CHARLES-CLAUD, in Biography, was born at Paris in 1639. Being of an unsettled disposition, he resolved to go to the Indies to seek his fortune, but the vessel in which he failed having been captured by the English, he was brought to London, where he fulfilled for some time by teaching the French language. On his return to his own country, he obtained the post of preceptor to Madeleine de Blois, afterwards duchess of Orleans, and other considerable offices among the great. He became a member of the French academy in 1668, and died at Paris in 1719. 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 Bossuet. He was an elegant scholar, and greatly devoted to poetry and polite literature. His works are numerous, of which the principal are "Principes de Philosophie," in which he adduces many arguments in defence of a God, and of the immortality of the soul.


GENEST-DAMBRESTER, Sr, in Geography, a town of France, in the department of the Vienne; seven miles W. of Châtellerault.

GENEST-MALLISANT, Sr, 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 1657, and the canton 5648 inhabitants, on a territory of 150 Kilometres, in five communes.

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 Scotus, 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 simony. His talents recommended him to the notice of the archbishop of Aix, for whom 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 system of moral theology, which was afterwards published in six volumes 12mo. under the title of "Morale 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 professed for having admitted into his diocese the religious belonging to a new convent at Touloufes, which Louis XIV. had suppressed. By the arbitrary mandate of the king, the good bishop was arrested, and imprisoned for fifteen months in the ile of lle, whence he was released by the intercession of the pope. He was accidentally drowned in 1702. Moreiri.

GENEA, or Genes, said to be derived from form, bone nature, in the Manager, &c. a small-sized, well-proportioned Spanish horse.

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

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 Abdaramo. The badge of the order was a garter, enamelled azure, spotted or fleeced gules, and collared or. On a mount vert, enamelled with flowers proper. This badge was worn pendent 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 devising the order of the star, in honour of the holy virgin.

GENETHLIA, in *Antiquity*, a solemnity kept in memory of some person deceased.

GENETHLACI, formed of the Greek genethlos, origin, generation, nativity, in *Astronomy*, persons who erect horoscopes, or pretend to foretell what shall happen, a man, by means of the stars which preceded at his nativity.

The ancients called them *Chaldaei*, and by the general name *mathematici*: accordingly, the several civil and canon laws, which we find made against the mathematicians, only respect the genethlaici, or astrologers.

They were expelled Rome by a formal decree of the senate; and yet found so much protection from the cedulity of the people, that they remained therein unmolested. Hence an ancient author speaks of them as "honinum genus, quod in civitate non firumperet & vetabitur, &c."

Antipater and Archinapulus have shewn, that genethlogi should rather be founded on the time of the conception, than on that of the birth. Vitruvius.

GENETHLLLLC, GENETHLACI Poem, is a composition in verse, on the birth of some prince, or other illustrious person; wherein the poet promises him great honours, advantages, successes, victories, &c. by a kind of prophecy or prediction: such is the eulogy of Virgil to Pollio, beginning,

"Sicelides Mufas, paulo majora canamus."

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

GENETIDES, in Natural History, a name given by the ancients to the fome more generally known under the name enchymonies. This was the spcr incertid on the top of the sides of the caverns, which they supposed daily to bring forth more, and therefore gave the powder of it to women at the time of their lying-in, to promote their speedy delivery.

GENETTA, To ride à la, is to ride in the Spanish fashion, i.e. with the stirrups short, that the spurs beat upon the flanks of the horse. This is deemed a piece of gallantry in Spain, but not among us.

GENETTA, in Zoology, a species of *Pomer*, which see.

GENETTE, in the Manager, 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 their chin pass through this curb, which surrounds his head. This sort of bit was much used at the court of France when Guillet wrote.

GENETYLLIS, in *Antiquity*, a solemnity celebrated by women, in honour of Genetyllis, the goddess of that fex.

GENEVA, or GIS, a popular name for a compound water,
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water, which is, or ought to be, procured from the berries of the juniper-tree, distilled with brandy or malt-spirits. See Juniperus.

The word is formed from Geneva, 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 wo, or other fermented liquors, to add to the working some aromatic ingredient, such as ginger, cortex Winteranas, 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 very valuable virtues also to the spirit, they brought it to a general custom, and the liquor sold under this name. The method of adding the berries was to 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 of 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 Geography, a city of France (since the revolution), principal place of the district, and capital of the department, but formerly the 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," or "Leman lake," upon the narrowest part of it; where the Rhone issues in two large and rapid streams, which, from 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 gentle 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 stories. 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 burgheiship, and to the privileges which the government allows to all foreigners. The members of this city are distinguished into citizens and burgesses, inhabitants and natives, besides a fifth class, established after the revolution in 1782, and called "domestic," who receive from the magistrate 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 inhabitants, who possess additional advantages: these two last classes form a large majority of the people.

The liberal policy of this government, in receiving strangers, and conferring the burgheiship, 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 borrows, 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 Cæsar. (De Bell. Gall. i. c. i.) It belonged to the Allobroges (see this article), and flourished under the succourers of Cæsar. 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, having settled in the country of Vaud, and built several strongholds, assumed the name of Bourguignons, or, according to modern orthography, Burgundians, had possession of it; and in the year 629, it was transferred to the Franks. Towards the end of the 8th century, Charlemagne convened an assembly of his states 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 enlarga 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 exercised by a third power, no less formidable than either of the other two. The counts of Savoy became powerful by the successive possession of several provinces; and among the rest the Genevois favourable 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 recite, in minute detail the contests that were from time to time renewed between the Genevois 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 Amadas, 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, assuring him of their con-
GENEVA.

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 engraven in Latin, and the observance of it sworn to by the bishop, the syndics, and the council, was subscribed by all the magistrates, commonality, 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 Membrani," 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 contest 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 interest of the duke of Savoy, and the other declared itself on the side of liberty. Those of the latter description were called "Eignots," which in Swiss, or High German, signifies "confederates by oath," and from which the term "Hugonots" is probably derived; whilst those of the former were denominated "Mamalukes," in reference to the Egyptian field-soldiers, 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 persuaded 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 Dauphine, 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 imprudent 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 resumed 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 ascendancy which Calvin, though a foreigner, acquired over the citizens, that he policed considerable influence even in civil matters; and was eminently instrumental in settling the political constitution. To this end, as well as to encourage theological erudition, 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, eminent for their superior knowledge, read lectures with such uncommon reputation and success, as attracted students from all quarters. It had also a public library, which owed its origin about this period to the liberality of Bonnivard, prior of St. Victor, who was twice imprisoned for having affrighted, against the dukes of Savoy, the independence of Geneva. He was a principal promoter of the reformation by gentle means and gradual infraduction. 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. Geneve was now regarded as the asylum of the reformed religion; and by the accession 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 Zürich 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 perfidious 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 1754, formally acknowledge the independence of the republic. From that period, the history of Geneva contains little more than a narrative of contents between the arithmetical 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 arithmetical and popular cantons; more democratic than any of the former, as the sovereign and legislative authority were vested in the general assembly of the citizens; but more arithmetical than the other, because the powers entrusted with the great and little councils were very considerable. The salaries of the magistrates were so inconsiderable, as not to offer any temptation of pecuniary emolument; and the revenues of government, at the highest calculation, generally amounted to 30,000 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 corn 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 distracted 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 Jaoulcurt, the commander of the French troops, threatened, in case of refusal, to enter the town by force, and inflicted 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 be reinstated. Relentless in these circumstances must have been altogether unwavering, and must, 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
commanders made their entry at the head of their respective troops, with drums beating and colours flying. The aristocratic 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 Verfaillies and Turin, and by the canton of Bern, was confirmed by the great and little councils. Much as the Genevans seemed to demand the consequences of this revolution, the change that was made in their constitution, and the diminution of liberty, to which they had been accustomed, and to which they ascribed the in crease of their population and riches, the ferment soon subsided: 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. Coxe, this revolution caused fearfully 600 persons to leave Geneva. The emigrants principally established themselves at Bruffles and Constance; where they introduced manufactures of linen and of watches. A plan was also formed for giving an asylum to the Geneva 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 aristocratic party was obliged to yield, on this occasion, to the tumultuous 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 1789; such moderate demands were received with satisfaction: and the new edict of pacification, under the title of "Modifications à l'Édit 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 aristocratic form established in 1782. It is natural to imagine that the widely extended influence of the French revolution would very soon reach the Geneva republic. Many, seduced by the principles of infidelity actively disseminated by Voltaire, and fascinated by the system of general equality laid down in the "Social Contract" of Rousseau, whom they proudly stiled the philosopher of Geneva, became the apostles of irreligion and democracy. Accordingly, a large party was pro-difposed 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, emigrants from France excited an insurrection among the peasants of the Genevains, and a large body of them marched towards Geneva, to demand the extension of the burgesseship. Although this last hostile attempt proved unsuccessful, the government, apprehensive of another insurrection, and anxious to remove every cause of complaint, granted additional privileges to the natives, and particularly general admission to the burgesseship for the small sum of five francs. (March 1791.) Soon after the abolition of monarchy, the Briffotine party, in conformity with their plan of surrounding France with a chain of petty republics, proposed to separate Geneva from the Helvetic confederation, and either form it into a small independent commonwealth, or incorporate it with the French republic. Although this attempt failed, the independence of Geneva was at length annihilated, and it was incorporated, together with its territory, with the French republic in 1793, and now forms part of the department of Leman, (which see.) Geneva, according to this new division, comprehends three cantons, 22 communes, on a territory of 125 square miles. N. lat. 46° 17'. E. long. 6° 8' 39". Mod. Ul. Hill. vol. xxii. Coxe's Travels in Switzerland, vol. ii.

Geneva, a post-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 Oconia castle, and 92 W. of White-town. It has nearly 100 houses. N. lat. 42° 52'. W. long. 74° 6'.

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 slopes for a considerable distance to the margin of the lake, and is enriched with all the varieties which nature can bellow: the long ridge of the Jura, fertile in pasturage, and varied with woods, backs this beautiful tract. Near Lausanne the banks are very considerably, and form a most charming terrace. A few miles beyond is a rapid defile. Near Veyas 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 sounding it, he had found the greatest depth to be 160 fathom. The surface of the lake is said to be 1250 feet, and its greatest part 837 feet above the Mediterranean; like all inland lakes enclosed within high mountains, it is subject to sudden storms. The sky is often clouded with a dark shadow, which appears in December and retires in February, because this lake is almost totally dellitute of reeds and rushes, in which they form their floating Neil, are an elegant article of luxury, and sell for about 12 or 14 shillings 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 isthmus.

Geneva, New, a thriving post-town of America, on the bank of the Monongahela river, just below George's creek, about 18 miles N. of Morgantown; this town is rendered famous as a place of much business, partly by the glufs-works in its vicinity, which not only supply the neighbourhood with window-ghost bottles, &c. but feed large quantities down the river. Here is also a paper-mill, and a manufactury for mullets. Small boats are also built in this place.

Geneva, New, a village of the county of Waterford, Ireland, nearly opposite to Dunkannon fort, where many good houses were erected several years ago by government for the reception of the expatriated citizens of Geneva, but they
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 Gennsians of both sexes, who were either persons of some property, or veried 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 artists, 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 Genevans emigrants. This proposal, patronized by the lord-lieutenant, and unanimously confirmed 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 standard of gold was altered for the accommodation of the new manufacturers; the foundation of an academy, approved, upon an useful, extensive, and economical plan; in July 1783, several Genevans landed in Ireland; and when the nation had expended near 50,000l. the project was suddenly relinquished, and the settlement finally abandoned. The failure has been attributed to delays in the arrangement of so complicated a plan, 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 renunciation 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, from not finding the new town ready for their immediate reception; and the emigrants who possessed small property, having withdrawn their names, the rest, with the desire of a sufficient capital to settle in a foreign country, and to establish an extensive manufacture without 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 fund 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.

GENEVIEVE, St., a town of France, in the department of Paris; 6 miles W. of Paris.—Also, a town of France, in the department of the Aisne, and chief place of a canton, in the district of Fapolet; 27 miles N. of Rhoned. The town contains 12,411, and the canton 60,777 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 N. of the town of Charters. It contained, some years ago, more than 100 houses, and 465 inhabitants, besides negroes. N. lat. 37° 35'. W. long. 90° 44'.—Also, a town of Canada, on the Baltic. N. lat. 46° 38'. W. long. 72° 14'.

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

The congregation of St. Geneviève is a reform of the Augustinian canons. It was begun by St. Charles Feare, in the abbey of St. Vincent de Senlis, whereof he was abbot, in the year 1618.

In the year 1634, the abbey was made collegiate; and a general chapter, composed of the superiors of fifteen houses who had now received the reform, chose F. Faure coadjutor of the abbey of St. Geneviève, and general of the whole congregation. Such was its beginning.

It has since increased very much, and has confided to it of above a hundred monasteries; in 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. Geneviève, which is the chief of the order, and whole abbot is the general of it. The abbey itself took its name from St. Geneviève, the patroness of the city of Paris, who died in the year 512. Five years after her death, Clovis erected the church of St. Geneviève, under the name and invocation of St. Peter, where her relics have been preserved, her shrine visited, and her image carried with great processions and ceremonies, upon extraordinary occasions, as when some great favour is to be intreated of heaven.

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

GENEVOIS, or DUCHY OF GENEVA, a province of Savoy, bounded on the N. by the Swiss territories, on the E. by Faucigny, 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 Ile; 10 miles S. of Grenoble.

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

GENGA, 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 his manner in the midst 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, Sienna, Forli, Pefaro, 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 literary and architect.

GENGA, BERNARDI, 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 18th century; and, according to Mangeti, 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, when it was not generally admitted in Italy; but he attributed the discovery of it to Paul Sarsi.
He also ventured to accuse Hippocrates of committing such errors, in the care of several bygone disciplines, as would not be pardoned in a student. His works are, 1. "Anatomia Chirurgica;" or, "Historia dell' olla e mucidi del corpo umano, con la descrizione de' vari;" Rome, 1675, 1687. 2. "Anatomia per furo ed intelligenza del deligno;" Rome, 1691. This work contains some good figures of the ancient statues. Genza prepared the bodies, by diffusing the bones and muscles in the forced attitude of the gladiators in their combats: and Lanciani added explanations of the figures. 3. "Commentaria Latina et Italeca ad Hippocratis Aphorismos; ed Chirurgiam pertinencia;" Rome, 1634, 8vo. Bonon. 1697, 8vo. Ely. 

GENGENBACH, in Geography, an imperial town of Germany, in the circle of Schwäbisch, situated on the Kinzig, in the Orient: in this town is an abbey, whose prelade was a prince of the empire. Among the indemnities agreed on at Ratibona in 1802, this town and abbey were given to the margrave of Baden; 15 miles S.E. of Straßburg. N. lat. 48 27'. E. long. 8 1'. 

GENGOULÉ-ROYAL, St., a town of France, in the department of the Saône et Loire; celebrated for its wine; 11 miles N. of Cluny. 

GENIAL, GENIALIS, an epithet applied by the ancients to certain deities, whom they suppos'd to preceed over generation. 

They were thus called a geri-do, from bearing: or, according to the correction of Scaliger and Vossius, a genemio, to yeem, produce: yet Fellus says, that they were also called geruli, which seems to require the farmer reading. M. Dacier, in a note, shews that genere has the sense of παθην. 

Among the genial gods, dii genialis, says Fellus, were water, earth, fire, and air, which the Greeks called elements. The twelve signs were sometime also ranked in the number: as also the sun and moon. 

GENICULATUS, CULUS, in Botany, a shrub bent like the knee, as in Althœcus geniculatus; see Culmus; and CAULIS, d. 19. 

GENICULI, the joints or knots 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 Aveaire, and chief place of a canton, in the district of Epernon; 18 miles E.N.E. of Rhôdes. N. lat. 44° 28'. E. long. 3° 3'. The place contains 33,323, and the canton 79,838 inhabitants, on a territory of 2032 square miles, in 8 communes.—Allo, a town of France, in the department of the Gard; 3 miles N.W. of Nîmes.—Allo, a town of France, in the department of the Lower Alps; 6 miles N.E. of Sillery. 

GENI, in Mythology. See GENIUS. 

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

GENICULATUS, in Anatomy, (from genus, the chin; and gulosus, the tongue,) a large muscle belonging to the tongue. See Dissection. 

GENICULATUS, in Anatomy, (from genis, the chin; and gulosus, the tongue,) a large muscle belonging to the tongue. See Dissection. 

GENIUS, in Botany, from genus, a head, and s-, the mouth, because the orifice of the flower is bofed with a dense fringe. Forst. Gen. t. 12. Scherb. 131. 


GEN. Ch. Col. Perianth inferior, tunicate, permanent, with five acute segments. Cor. of one petal, funnel-shaped; tube dilated upwards, longer than the calyx, its orifice bearded; limb spreading, in five deep, ovate, rather pointed segments, as long as the tube. Stam. Filaments five, short, in the tube of the corolla; anthers oblong, prominent. Fil. German superior, ovate; style thread-shaped, longer than the tube; stigma cylindrical, obtuse, furrowed. Pericarpule oblong, of two cells. Seed enormous, 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. rugulata. Forst. 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 long, elliptic-lanceolate, pointed, entire, slightly wavy, smooth, opague, with one rib, and a few remote, curved, interbranching veins. Peduncles slender, smooth, cuneilled, half an inch long. Stipulas intrafoliaceous, united, short, acute, rather membranous. Flowers small, in solitary, forked, opposite, somewhat downy, axillary panicles, rather longer than the flower-tubes. 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 specimens. Jussief probably never saw the plant; or we think he would have referred it to his Genes. No figure has been published, except of the fruitification. 

GENIPA. (See GARDENIA.) The name is barbarous, of West Indian origin, and appears to be sometimes called Guaret. See Tournefort, 678. 

GENEBABU, in Geography, a river of Brasih, which runs into the Atlantic, S. lat. 5° 75'. 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 682, and the canton 12,600 inhabitants, on a territory of 2122 square miles, in 17 communes.—Allo, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of Chambery, near the conflux of the Rhône and Guiers; 15 miles W. of Chambery. The place contains 1550, and the canton 7622 inhabitants, on a territory of 1124 square miles, 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 2450, and the canton 15,532 inhabitants, on a territory of 972 square miles, in 10 communes. 

The left, or Curnar fort, 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 fort of attention as other tender kinds of greenhouse plants.

Each of the first fix arts are 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 left kind produces a variety among other evergreen plants in the green-house collections.

*GENITA* BRITANNICA, in Geography, a town of America, in Powhatan county, Virginia, 156 miles from Washington.

In *Meditations*, a goddef who preferred over birth-child, to whom the Romans sacrificed a dog.

**GENITAL, GENITALIA**, in Anatomy, something that relates to generation; which fec.

**GENITALIUS, genitales**, are sometimes used in the ancient Roman poets for those we otherwise call *indigetes*.

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

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

**GENIETE, in Geography, a town of France, in the department of the Correze; 18 miles W. of Drive.**

**GENIETE, in Grammar. See GENERATED.**

**GENITIVES, PATER, or Genites, among the Hebrews, those that descended from Abraham, without any mixture of foreign blood.**

The Greeks distinguished by the names of genities such of the Jews as were fuced 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 apoprophe, with the letter *s* coming after its as "thy father's house." when the plural ends in *s*, the other *s* is omitted, but the apoprophe is retained, as "on eagles' wings." Sometimes also, when the final terminations in *s*, the apoprophe is not added; as "my right shoulder." In French the genitive is expressed by *de*, or *des*, &c. though, in the to this, there are no cases at all, or at most only two, in either of these languages, inf--much as they do not express the different relation of things by different terminations, but only by additional prepositions. (See Case.)

An ingenious grammian observer, that though the termination called the genitive case be rendered by *of*, it means invariably from, beginning, motive; and this, he says, seems to be the true signification of *of*, if we regard its etymology, it being taken from *ex*, *ect*, *ab*, *from*; and though custom seems to have assigned it some different undefinable meaning, it is in all cases referable into the
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The fene 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 in all other inferences. And this is the reason why some prepositions which signify origin or beginning in Greek, Latin, and French, are rendered in our tongue by *genius*. 

In the Latin, this relation is expressed in divers manner, thus we say, caput hominis, the head of a man; color reo, the colour of a reft; 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, *voluum Achilis*, the wound of Achilles, the genitive, Achilis, may either signify passively the wound Achilles has received, or actively the wound Achilis has given; thus in that passage of St. Paul, *Cersius funt, quaeque mori, quaeque vita, et nos patrem*; the genitive *Dei* 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, St. in Geography, a town of Naples, in Calabria Cirta; 21 miles N. W. of Bifighano.

GENIUS, in Mythology, a good or evil spirit, or daemon, whom the ancients suppos'd to pervade each person, to direct his birth, accompany him in life, and be his guard until death. Tho' those that attended women were females, and called Junonis, but those that attended men were males, and called Geni. 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 were 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 Geni, 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 afflicted; such as epidemical 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 to others, where they were promis'd a more solemn worship.

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

Of these genii or demons, Plato supposes that every man has his own, who is his guardian, and the withefs, 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 censures and reprimands him very severely, as, on the other hand, he pronounces an encomium upon him when what he says is true; and it is upon the approbation of the genius, that the doom is pronounced; for this demon knows whatever passeth in the man, even his most secret thoughts.

Although Plato and Jamblichus were of opinion that every individual had but one of these geni to conduct him, and to preside over all his actions, other philosophers of the same school were persuaded, that he had two, the one good, the other bad. To this purpose Servius upon Virgil (En. l. vi. c. 745.) says, "Volunt unicusgenium opponitum, Demone bonum et malum; hoc est, rationem quae ad meliorem rem portatur, et libidinem quae ad pejor; hic est Larva et genius malus; ille bonus genius et Lar. "They will have it 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 vital region, or extent of air, between earth and heaven. They were a fort 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 trilling 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 pulions from the other, and who had a body framed of an aerial matter. Most of the philosophers, however, held that the genius 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 befel 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 force were much more powerful than others; on which principle it was, that a wizard in Appian bids Antony keep a distance from Octavius, because Antony's Genius was inferior to, and flood in awe of, that of Octavius.

There were also evil Genii, who took a pleasure in percuting 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 larus, and lemures.

According to the theology of Hebra, the men of the golden age became demons, or good genii; tho' he, according to him, are the guardians of men, the earth having fallen to their lot. Tho' of the silver age were changed into manes, or substerraneous 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, or the Ellysiinn fields, situate at the extremities of the world. See DEMON, and DEMON OF Socrates.

The Mahometans also admit the existence of Genii, suppos'd 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 restrained sense, for a natural talent, or disposition to one thing more than another. In which sense we lay, a genius for verve, for the sciences, &c.

Dr. Bihir, 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 these 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 rest in mere sensibility 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 acceptation, extends much further, 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 by them alone be acquired. As genius is a higher faculty than taste, it is more limited in the sphere of its operations. While 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 indiscriminately 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, in a poet or orator, may sometimes exist in a higher degree than taste; that is, genius may be bold and strong, while taste is neither very delicate, nor very correct. This is often the case in the infancy of a art; a period when genius frequently exerts itself with great vigour, and executes with much warmth; while taste, which requires experience, and improves by slow degrees, is not yet attained in its full growth. Homer and Shakespeare 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 excited 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 Montesquieu 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 Chari-

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 feebler 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 Roufseau (Diction de Mus.) has ventured an article for it among musical terms, and has written it with peculiar eloquence and enthusiasm.

Roufseau, paradoxical on almost all other subjects, is sometimes not only capricious, but mischievous; 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 8599 inhabitants, on a territory of 1874 kilometers, in 27 communes.

Gennaba, a town of Peria, in Farilitan, in the Persian gulf; 15 miles N.W. of Bender Rigk.

Gennadius I., in Biography, patriarch of Constantinople, was elected to that dignity, having been some years an ordained prebender of the church, in the year 458, on the death of Antoninus. In the following year, in a council of 73 bishops, he procured the pulling of a canon against liminal for the government and manners of the church, which had been endeavour to claim for the patriarch's treasurers, should thenceforth 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 see. He is placed by those who lived about the same period among the ecclesiastic 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 synod Epistle" against simony, inserted in the fourth volume of the Collect. Concil.; and fragments against the anthems of Cyril of Alexandria, quoted by Facundus, bishop of Hermia, and another from a treatise addressed to Parthenius, and quoted by Leontius. Moreri.

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 Palaeologus, and
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 Scholarius 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 1445, Scholarius 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 1459, after finding a valedictory oration to the emperor, entered as a monk 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 the subject of the union, but the monarch was not to be turned from his plan, and made every effort, by perjury and by threats, to bring over Gennadius. The attempt was futile: 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 desertion 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 unbleached 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 consult him, as the oracle of the church. He was invisible, and entered, as it should seem, in deep meditation, or divine rapture; but he had expounded 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, wilt ye put your trust in the Italians? In abandoning your faith, ye 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, consider, pensive, and repent! At the same moment that you renounce the religion of your fathers by embracing impurity, you submit to a foreign servitude." This was the signal for insurrection, (see Constantinople) and, after the capture of the city, the sultan Mahomet, with the innumerable inhabitants who had survived the inhuman slaughter made by his army, and of recalling the Greeks, who had escaped, to their deserted houses, ordered Gennadius to be brought, 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 imitated. 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 fortress, presented him with a horne richly caparisoned, and directed the viziers and bailiffs 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 sixty 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 1460. He was 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 to produce in support of the truth of Christianity. It is to be found in Crusius's Turkish-Greek. and is also in David Chytrzeus's "De Rerum Ecclesiae in Graecia," Gennadius wrote likewise a treatise concerning predilection, and another on the trinity. He composed many homilies in the early part of his, 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.

GENNADUS, an ecclesiastical writer, flourished towards the close of the fifth century, and became prior of Marcella. He was a great writer, and is said to have composed eight books against all heretics, six against Nestorius, three against Pelagius, and a treatise concerning the millennium and the book of Revelation; but the only works remaining of this author are entitled "De viris illustribus," which is a continuation of St. Jerome's catalogue of Ecclesiastical Writers; and a treatise "De Fide, leu de dogmatibus Ecclesiae Libri ad Gelatam Papam mitit." 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 605. Gennare, Cesare, and Benedetto, two brothers who both made painting their profession. They were nephews, heirs, copyists, and imitators of Guercino; they frequently repeated his pictures, but not with adequate sweetness or force. At first they wrought 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, divisible by a labourious, 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.

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

GENP, a town of France, in the department of the Loir, 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.'

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

trict of Saumur; 5 miles N.E. of La Guerche. The place contains 1,433, and the canton 8,249 inhabitants, on a territory of 190 kilometres, in 15 parishes.

GENOA, and since the French revolution the "Ligurian republic," is a small, mountainous territory, in the northern part of Italy, forming a kind of cleft 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 Parmesan. It length from the town of Vintimiglia on the west, almost to the territory of the republic of Uccle on the east, is about 150 miles, and its greatest breadth, from 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 forests, in others they are barren rocks, and in some few parts they yield excellent pastures. 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 wine, 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-corms, and olives grow in great plenty, particularly round the gulf of Spezia. Salt is produced for exportation. The Apennines, and some other hills, supply them with excellent marble, while Polzevera, in the Boccella, yields the beautiful stone so called, being ferpen
tine of various colours veined with marble, which is easily conveyed by a magnificent road formed, in 1778, from the Boccella, or mountains to the north of Genoa, through the Polzevera, by three years' labour of from five to eight hun
dred men, at the expense of one patriotic and noble family, the Cambias. The inhabitants of this country, amounting to about 450,000, are Roman Catholics, though the papal power is not much venerated; the people being devoted to commerce, and disposed to receive mafloned 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 Mef
tina and other places; gold and silver ruffs, heco, gloves, stockings, ribbons, foap, paper, &c. Other articles of commerce are, oil, fruit, macaroni, confectionery, Par
desan cheese, 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. 298, 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 after
tswards recovered by Beliarus, when he entirely subdued the Goths; and when the Lombards invaded Italy, this city remained for some time un molested, deriving an accession 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 popula
tness, was erected into a marquisate. It soon after
ds became so powerful, under the Genoese empire, and after it had obtained a kind of independence, that, in 868, it reduced the island of Corsica, 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 aristocratical republic, under a chief called doge, (see Doge,) elected every 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 ad
duity, 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 15 years; but when a treaty of peace was concluded between them, they concerted 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 Syractse; they also made themselves masters of the Black sea, formed establishments in the Crimea, and in the suburbs of Persa, at Constantinople, where they remained till the Turks took that city. In the thirteenth century, they added to their conquests the towns of Albengo, 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. Exhausted 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 exactions of Andrew Doria. Doria, having driven out the French, and gained possession of Genoa, assembled 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 deserved to receive. (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 Emmanuel, duke of Saxony, 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
peace with France and Savoy restored the republic to its former situation, at the commencement of the war. In 1636, the Spaniards attempted to besiege the city, but the enterprise was frustrated; and from this time till the year 1656, Genoa enjoyed all the blessings of peace and commerce. In the following year Hippolito Centurioni, 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 result 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 affluently cultivated commerce, and whatever should render the republic powerful and happy. Some petty jealousies and differences arose between her and Venice, the father and rival republic; but they were such as terminated amicably, and never caused any disturbance to the repose of Italy. In the year 1684, the Genoese unfortunately incurred the resentment of Louis XIV., who looked with jealousy on their attachment to Spain; and could not permit them to support the republic under the protection of that crown. His attempts for humbleing them proved too successful; but in consequence of their submission, and the interruption of the peace, peace was obtained. The terms stipulated by the French were peculiarly severe and oppressive; among others, they required that the doge and four censors 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 with the neutrality, and enjoyed the advantages of peace and commerce, while the dominions of their neighbour, Victor Amadeus, duke of Savoy, underwent all the calamities of war. In 1713, Charles VI. sold the marquise of Finale to the republic for a considerable sum of money. In 1743, the queen of Hungary, having at the treaty of Worms ceded to the king of Sardinia all her rights to the town and marquise of Finale, and demanding that the Genoese should deliver up the marquise, 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 Imperialist's feizes 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 confit of 28 families, whom Andrew Doria, in 1528, separated 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 commoners. Since that time it has been found necessary to create other nobility. The nobility of Genoa were allowed to keep manufactures of velvet, silk, and cloth, to farm the duties, and to have stores 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, recently celebrated 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, Corsica, Malta, Majorca, Minorca, Candia, 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 Janua, frequently, though corruptly, called by the Latin writers Januata, is the capital of the country described in the preceding article. It is situated partly on a level finbad 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 Balbi," 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 preserved a curious hexagonal dih, said to be made of a female emerald, found at Cariarca in the time of the Crusades, which the Genoese received as a token of their valour. 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 34,000 men, models for bridges, the armours worn by a number of the Genoese women in the crusades, a shield containing 120 pistols, made by Julius Caesar Vaches, for the purpose of affrighting the doge and senates at one time. Other public buildings are the Albergo, which serves as a poor-house, and house of correction, where is a beautiful relic, the Virgin supporting a dead Christ, by Michael Angelo, and the assumption of the Virgin, in white marble, by Puget, an inimitable piece of sculpture; a large hospital for the sick of all nations and religions; the conservatory, for educating and portioning 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 galleys and small vessels; nevertheless the city is much exposed to a bombardment. The number of inhabitants is estimated at 80,000. N. lat. 44° 2' 56". E. long. 8° 57'.

**Genoa Bar, a reef of rocks, extending some miles from the north coast of the island of Bahama. N. lat. 26° 20'. W. long. 70° 36'.

**Genoa Balsam, in Medicine, the name of a famous composition, called also the balsam of Aquapendente. 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 Vellutius, but the medicine is now out of use.

**Genol. 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...
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 9,5 9 inhabitants, on a territory of 195 kilo-
metres, in 13 communes.

GENOPLESIUM, in Botany, from gen., a genus, and pleion, a early akin, indicating its great affinity to Prospophy-
lum, another new orchidaceous genus of Mr. Brown's. The name is but too expressive of many genera recently established, infomuch that it is wonderful no writer has hit upon it before. Brown Prod. Nov. Holl. v. 1, 319. Chas. and order, Gynandra Monandria. Nat. Ord. Orchide. 

Gen. Ch. Cal. Perianth ringlet, helmet-like in front, its two lower or posterior leaves longer and spreading. Cor. Petals, (inner calyx-leaves of Mr. Brown,) attached below to the column. Nectary, or lip, ascending, undivided, hooded at the base, without a spur. Style; or column, cloven half way down, without any lateral incised or mem-
ments, in which last particular alone it differs from Prospophy-
lum. Anter parallel to the stigma, permanent, its cells close together. Males of pollen not observed. The only species is 

G. Baueri, seen by Mr. Brown growing near Port Jack-
son, 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 pro-
vince of Otranto; 10 miles S.E. of Otranto.

GENOVESI, Anthony, in Biography, a man of letters, and
philosopher, was born of parents of very moderate cir-
cumstances, 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 neighbouring penant in-
duced his father to place him, at a distance from home, under the care of a lay ecclesiastic, who was an able classical scho-
lar, 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 sur-
mounted all difficulties; before, however, he was in a situa-
tion to maintain a wife, he, at the instigation of his father, married. This disappointment 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 Canza. Unfortunately for Genovesi 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 pursuits, and after diligently stu-
dying 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 syllabus, 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 Gabai, the director of the Neapo-
litan universities, he was appointed to the office of pro-
fessor of ethics, which afforded him ample field for combating the ignorance and prejudices of the schools. The principle of his syllabus 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 in-
tervened in his lectures the history of the human passions,

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and enlivened them by a boldness and spirit peculiarly his own. He compiled a new system of logic, which he dictated in his lectures, and which was afterwards published in 1745, under the title of "Elementorum Artis Logico-critici, 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 imme-
diately regarded as unfit for so high an office in the church, on account of his heretical notions. His enemies now dis-
covered the most serious and alarming doctrines, in the pub-
lished and unpublished pieces of which he had been the author. He was obliged therefore to renounce the science of theology, and to suppress some valuable 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 deserving of notice on this science, but struck out some new lights. He published, in 1753, the first fruits of his re-
searches, entitled "Essays on Agriculture, with Considera-
tions on the True Object of Sciences." He was now, at the influence of his friend Interni, made professor of political econ-
omy, with a considerable salary. The office had been intuited solely for him, and it was agreed that the lectures should always be delivered in the Italian language, a circumstance, at that time, wholly 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 econ-
omy, to inspire the Neapolitan youth with the social and civil virtues, and above all with a public spirit of patriotism, without which no nation, he contended, could attain to that height of prosperity which it is 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 causers 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 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 "Dioecysis." His health now gave way, and he was unable to prosecute his studies, and, in 1768, he was obliged to discontinue his lec-
tures, and in the following year he expired, in the fifty-
fifth 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 professed a lofty abject 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, tranquility, and invin-
cible courage. He was too proud to float to flattery in order to become rich, and was contented with a very mode-
rate income." He died poor, and would have been in disreputable circumstances in the latter years of his life, had not the sovereign supported him unreservedly. He was held in high estimation by pope Benedict XIV. and many of the cardinals; and by inspiring 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.


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

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 Senaar.

GENSAC, a town of France, in the department of the Gironda; nine miles S. E. of Libourne.

GENS D’ARMES. See GENDARMES. 

GENSERIC, in Biography, a famous king of the Vandals, succeeded his brother Genseric in his Spanish dominions in the year 428. He had already signalized his courage and skill in war, and was enured 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 perfecution of the Donatists was an event highly favourable to the designs of Genseric. Seventeen years before he had landed in Africa, a public conference was held at Carthage by order of the magistrate, which ended in a most severe persecution. Under these circumstances, Genseric, 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. Genseric obtained the mostsignal 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 Mauritania. He delivered to the Romans his own son Hunneric, as a hostage for the observance of his treaty; but they, trusting to his good faith, sent back the youth. Genseric abjured this indulgence by seizing upon the city of Carthage in 439, at a time when the empire was engaged in a war with the Goths. From Carthage he failed with a large fleet, and landed in Sicily. He ravaged almost the whole of that island, and made a vast booty, 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, Theodofius and Valentinian, thought it necessary to join against him. They fitted out a powerful fleet, with a large army, defined for the recovery of Africa; but Genseric defeated them by proposals of accommodation, and the interruption of the Huns obliged Theodofius to recall his forces.

When Maximus ascended the western throne, he compelled Endo, the widow of Valentinian III., to marry him; and in a short time secretly applied for the dangerous aid of Genseric to free her from his tyranny. He, seizing the occasion, appeared at the mouth of the Tiber with a numerous fleet; and in the contest Maximus was slain, which afforded Genseric 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 soldiery; and on his return he carried away an immense quantity of treasure, besides multitudes of captives, chiefly of the female sex, among whom were the empress and her two daughters, one of whom he married to his son Hunneric; and after the lapse of several years, he restored the other and her mother to their native place. Genseric 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 for the purpose, which obliged Genseric to sue for peace. His suit being rejected, he sent out a squadron, which coming unawares upon the Roman navy, in the bay of Carthagena, 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, Genseric prepared to repent his aggressions, and he again ravaged the coasts of Italy and Sicily, and even took possession of Sardinia. He extended his dominions 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 citizens of Zacynthus, and to have thrown their dead bodies into the sea. Leo, the eastern emperor, refused to make an effort to free his dominions from this terrible scourge, and made vast preparations for the invasion of Africa. The conduct of the expedition was given to Baiulicus, who might have extinguished for ever the kingdom of the Vandals, had he seized the moment of confusion, and boldly advanced to the capital. Genseric beheld the danger with firmness, and clutched 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. Baiulicus conformed to the fatal truce; and during the short interval, the wind became favourable to the designs of Genseric. He manned his largest ships of war with the bravest of the Vandals and Moors; and they towed after them many large barks 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 imminent danger. "Their close and crowded order," says the historian, "affiliated 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 din of the cries of the soldiers and mariners, who could neither command, nor obey, increased the horror of the nocturnal tumult." Baiulicus returned ingloriously to Constaninople with the remainder of his shattered fleet; and thus the fruits of all this mighty effort were lost. Genseric 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 Odacer, 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. Genseric died in the year 479. 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 pressed to dispute his will in synods and churches; and his fierce mind was incapable of fear, or compassion. His Catholic subjects he oppressed with intolerable laws, and arbitrary punishments. The language of Genseric was furious and formidable; the knowledge of his intentions might justify the most unfavourable interpretation of his actions; and
the Arians were reproached with the frequent executions which stained the palace, and the dominions of the tyrant, Gibbon. Univer. Hist.

GENTIAH, in Geography, a town of Asia, in the country of Affan; 370 miles E. of Patna. N. lat. 25° 10'. E. long. 92° 10'.

GENTIAN, 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, of the genus 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 Bell-wort. The latter name, we presume, is derived from fel-gull, 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, Fel-wort.—Linn. Gen. 126. Schleg. 175. Willd. Sp. Pl. v. 1. 1331. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 284. Juss. 141. Lamarrk Illust. t. 109. Gerar. t. 114. Clas and order, Pentandra Dignesia. (Monogynia; Lamarrk.) Nat. Ord. Rotacae. Linn. Gentianae, Juss.

Gen. Ch. Col. Perianth inferior, in five deep, oblong, acute, permanent segments. Cor. of one petal, tubular in the lower part, without pores; in the upper five-leaf, regular, various in form and direction, withering. Stam. Filaments five, awl-shaped, shorter than the corolla, connected with its tube; anthers oblong, simple, sometimes united into a cylinder. Pfr. German superior, ovate or oblong, cylindrical, as long as the stamens; styles none; stigmas two, ovate, recurved. Peric. Capsule oblong, roundish, pointed, slightly cloven at the summit, of one cell and two concave indented valves. Seeds numerous, small, flattish. Receptacles two, affixed longitudinally to each valve.

Eff. Ch. Corolla tubular at the base, ditrifoliate of ne克拉iferous pores. Capsule superior, of one cell and two valves, with many seeds.

Obs. The figure of the fruit is constant, but the corolla is very different in different species, being either wheel-shaped, bell-shaped, or funnel-shaped. In some there are small intermediate segments, in others a fringe to the corolla; in some it is plaited, in others plain. A few species have a four-leaf tetrandrous flower; but the remark in Linn. Gen. 176, that there is a species with three additional parts of the flower, alludes to Chelone, once reckoned a Gentiana. Linnaeus has erased the line from his own copy, and his editors might easily have made the same correction. G. lutea, and some others, however, have frequently a superabundance of divisions and stamens in a few of their blossoms. The upper part of the germen so much resembles a style, that Lamarrck has perhaps offered no great violence to nature, or the Linnean system, 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; purpurea, Fl. Dan. t. 50, which is the Curcula of the Edinburgh Pharmacopoeia; pannonica, Jacq. Annl. t. 175; pulvinea, ibid. app. t. 28; and campanulata, t. 29. These are scarcely ever seen in gardens, except the first, which is not easily established; but few plants are more rately and ornamental. The North American G. foetida, Curt. Mag. t. 1039; and the alpine aperlae, Curt. Mag. t. 1078, 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. alpina, Curt. Mag. t. 52. Eng. Bot. t. 1594, is one of the most common in gardens, but requires rather a pure soil. G. verne, nearly allied to it in habit and beauty, see Eng. Bot. t. 493, 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. Punctum, ibid. t. 20, found on very 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 nivea, Eng. Bot. t. 896; Amarrella, t. 256; and campyliora, t. 237.

Linnaeus 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 rheed to advantage. Hence his verne and barbara are one species, and he confounded with lutea, which he seems never to have seen, or at least to have afterwards forgotten, the G. floribus, Lamb. diephalas, G. alpina, Pall. and Rott. t. 97. Hence the erroneous remark under lutea, "petal punctis spatios creberrimis flaga." There is some doubt whether G. futila, Sims in Curt. Mag. t. 1239, be the same as Pallis's t. 92, f. 2. 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-six species of Gentiana, some of which among the annual kinds we are not able to determine to our satisfaction. He quotes a monograph by Frolich, 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 Chelone and Chelonia 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. lutea); spotted flowered gentian (G. pulvinea); swallow-wort-leaved gentian (G. aperlai); and the dwarf gentian, or gentianella.

Method of Culture.—In the three first kinds it is easily effected by sowing 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 sown where they are to remain, but the first is probably the best method. In the spring 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 flaky 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 pressed close to the roots. If the following 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 destined 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 weakeneth them. They require afterwards no other culture but to dig the ground about them early in the spring before they begin to shoot, and in the summer to keep them clean from weeds. The roots continue many years, but the flasks decay every autumn;
the same roots not flowering two years together, or seldom oftener than every third. When they flower strong, they have, however, a fine appearance among other similar plants.

In respect to the last fort 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.

**Gentiana**, *Gentian*, in the *Materia Medica*. The root, which is the only medicinal part of the plant, has little or no smell, but to the taste it manifests great bitterness; a quantity which is extracted by aqueous, 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 less 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 floridich, but also anthelmintic, antifeptic, emmenagogue, antirheumatic, and febrifuge, this root has a better claim to the poffeifion of these powers than most of this kind. Many dyspeptic complaints, though arising from debility 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, coniunctly succeeded in curing intermittent, 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 compositum," and "Tinctura gentiana composita," (Ph. Lond.) and the "Infusum amarum," "Vinum amarum," "Tinctura amara," five "Elisir Floridichum" (Ph. Ed.) which latter is said by Dr. Cullen to be the same as Stoughton's elixir, (see Stomatic Elixir) and by both Pharmacopoeias 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 drams, and boiling water twelve ounces; and macerating for an hour in a covered vessel, and then draining the liquor. For the "tincture," take of gentian root dried, two ounces, orange-peel dried, an ounce, cardamon seeds bruised, half an ounce, and proof spirit two pints; 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 malt liquors are likewise impregnated 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 bitters Jews 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 ipecacuanha, more intensely bitter than any of the official bitter drugs. This root is greatly commended in obilinate intermitents, and other disorders; a scruple is said to be more effectual than repeated half drams of bark.

There was a mixture of hemlock 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. Tranf. vol. xlv. p. 240. Lewis's Mat. Med. Woodville's Mat. Med.

**Gentian Water.** See Water.

**Gentiana**, the forty-sixth natural order of plants in Jullieu's Syllun, or the thirteen his of his eighth class, so named from the principal genus contained in it. The character of this eighth class is *Coryleus* two. Flowers of one petal, inserted below the germs, regular or irregular. *Calyx* of one leaf. *Stamen* of a definite number, inserted into the corolla, and usually alternate with its divisions, when they agree in number. *Germ* superior, simple; *Hylo* one, (sometimes none in the Apocineus, with a double germ) *Stigma* simple or divided. *Fruit* superior, comifing either of naked 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 most 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 inclosed at the margin, involute where there is but one cell, flat and constituting the partition where there are two. *Seeds* numerous, small, inclosed into a marginal receptacle connected with the valves. *Stem* herbageous, rarely somewhat thorny. *Leaves* opposite, mostly undivided and fesible; floral ones occasionally smaller, referring broader, the flowers in pleasant clusters, as it becomes, as it were, doubly bracteated,--The first flower has a simple capsule, of one cell, and contains Gentiana, Lutea of Schreber (Pothia of Aublet), Piarum of Schreber (Coryleus of Aublet), *Seweria* and *Chloria*; the second, with a simple capsule of two cells, contains *Exacum*, *Lijantis*, *Myriaceae* of Schreber (Tachia of Aublet), *Chloris* and *Nigra*; the third with a didymous or two-leaved capsule of two cells, contains only *Spigelia* and *Opobrazia.* In a fourth fiction it seems as a kind to this order, by itself, *Nicandra* of Schreber (Petalia of Aublet.) The plants of this natural order are chiefly remarkable for their intense bitters, and consequent floridich virtues. Their flowers are usually beautiful, either blue, yellow or red, scarcely 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 Gentiana.

**Gentile, Gentilis**, a pagan, or person who adores false gods. The Hebrews apply the name Gentile, nation, to all the people of the earth who were not Hebrews or Egyptians. Some will have it that the gentiles were thus called in contradiction to the Jews, because the latter had a positive law
GENTILE.

law to observe in matters of religion, whereas the gentiles had only the natural law: hence they are called "gentiles, quia 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 doctor, or apostle 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 culting of the gentiles to Christianity had been predicted in the Old Testament, as it was accomplished in the New. See Psal. ii. 8. Isa. ii. 3. Jer. ii. 29. Matt. viii. 11. xii. 18. Acts xi. 18. xlii. 37. 48. xxviii. 28. Rom. i. 5. iii. 29. xi. 12, 13. 25. Eph. ii. 11. Rev. xi. 2. xxxii. 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 Apollos, 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 Apollos (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 Paul, 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 fulfilled, 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. Conflans, with whom his brother Constantius concurred, passed a law 341, ordering superstitious and sacrificial exercises to be abridged; and the practice of sacrificing to be abolished; under the menace of a proper and convenient punishment. This law was followed by another law of Conflans in the next year, 342, forbidding the demolition of temples, which stood without the walls of the city of Rome. Another law, which was the first of Conflantius, and passed, as it has been supposed, in the year 353, 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 Conflantius, in the same year, prohibited nocturnal sacrifices; and a law, published by the same emperor in the year 356, appointed capital punishment to such as were convicted of per-
or not. In which sense the word occurs in Ammianus, Au-
tonius, 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 Theodisi Code, in the title "De Nuptis
Gentilium;" where the word gentilis stands opposed to pro-
vinciales, or the inhabitants of the provinces of the em-
pire.
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.

Gentilesci, 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 diffilling himself at Florence, Turin, and
Genoa, he passed to Savoy and France, and thence was
invited into England by Charles 1. 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 him-
self and his family. After residing here about twelve years,
he died at the age of 84, in 1647. The charms and brilli-
ance of the stile 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.

Gentilesci, 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 prac-
ticed in portraits with great success. She also exercised her
talents in historical painting, and has left many highly credit-
able works behind her.

Her picture of Judith with the head of Holophernes 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.

Gentili, Alberico, was born in 1550, at Caf-
tel S. Genesio, in the marches of Ancona. He studied
the law, and took his degrees at the university of Pe-
rugia, and was proctor at Ascoli, when his father, becom-
ing a convert to the reformed religion, determined to quit
Italy, and take with him his sons 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
card 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 Virgilianae" prove that he
had cultivated polite literature very successfully. Bayle.

Gentili, Scipio, brother of the preceding, was born
in 1563, and, while a child, was sent to Tubingen for his
education. Here he distinguished himself in the study of
the classics and jurisprudence, which he afterwards pursued
with increasing success at the universities of Wittenberg
and Leyden. In 1589 he took his degree of doctor at Basli,
and then went to Wittenberg as a public expounder of the
law. Shortly after he removed to Altdorf, and became prin-
cipal 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 Altdorf 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
cantos of Tasso's Jerusalem. Bayle.

Gentilis, Gentilis, was born at Foligno, in Italy,
about the year 1320. He studied medicine under the tu-
tion of Thaddeus of Florence, with great diligence and re-
putation, 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 estimation in most of
the universities of Europe. Gentilis died at Bologna about
the year 1310, and left several treatises, which were col-
lected and published at Venice, in four volumes folio, in 1484,
1486, and 1492. The following works were likewise print-
ed separately: 1. "Expositions in textu Avicennae."—
Commento Aegidi Monachi Benedictini Libri de Judiciis
Urinarum, et Libri de Pullibus." Ibid. 1494.—4. "Con-
hiis peregrinatis ad quos seriorum totus corporis genera,
with some other tracts, Venice, 1563.—5. "Questiones et
Tractatus." Ibid. 1536, with the surgery of Dius de Gar-
bo.—7. "De proportionibus Medicinarum," with many
differencies upon the subject of doses of medicines by the
most celebrated physicians, Pedua 1556, &c. See Eloy.
Ditf. Hist.—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 Catho-
ic 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 dissatisfied
with the orthodox doctrine of the Trinity. He was required
to subscribe to the articles of faith which the persecteur John
Calvin had established against hereby, to which a promise was
annexed, never to do anything, directly or indirectly, that
should controvert the doctrine of the Trinity. At first Gent-
ilis refused the task, but was afterwards prevailed on to com-
y, dreading probably, in case of his refusal, a similar
treatment to that to which Servetus had experienced. What
his hand had signed, and his tongue confirmed, his heart ab-
horred; and in private he did for ever resolve, by the truth,
which coming to the ears of the magistrates, they commit-
ted him to prision. From the dungeon he endeavoured to
expostulate with his persecutor, dehowning the insufficientness
of his opinions, but their hearts were steeled against the sup-
lications of a heretic, till he offered to abjure his errors,
and committed to the ears of the law, 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 ex-
torted by terror, he withdrew from the city, and 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
at Bern, where he was accused of heresy. He underwent a long and tedious trial, and being convicted of obstinately upholding 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 too formidable to him, was now disarmed of its 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 unvailed glory of the Father.

GENTILLET, SACRA, among the Romans. See SACRA.

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

GENTILLET, VALENTINE, in Biography, a native of Dauphine, 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 Toulouse, and afterwards a scribe 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 works are, "An Apology for the Proteslants," which went through several editions in the French, and was afterwards translated into Latin and enlarged, under the title of "Apologia pro Christianis Gallia Religionis. Evangelici fac Reformata, qua doctor hujus Religionis fundamenta in Sacra Scriptura jacta eft," and "Le Bureau du Concile de Trente, &c." This was published in French in 1580, 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-Michiel," and the "Anti-foe," Bayle.

GENTINANETOUR, in Geography, a town of Hindoos, in the Carnatic, 39 miles W. of Cuddalore.

GENTIQUX ET PALLIER, a town of France, in the department of the Creuse, and chief place of a canton in the district of Aubusson; 9 miles S.W. of Pellellet. The place contains 907, and the canton 6,507 inhabitants, on a territory of 327,584,000 square feet.

GENTLE PIR ONE, in Mineralogy, a name given by our miners in Saffex, to a kind of iron ore found in considerable plenty in that county, and very readily running in the fire, though not over rich in metal. It is a strong substance, and lies in several parts of that county in form of a moderately thick stratum. It is of a dusky brown colour, and in some places much paler than in others. It has always a great number of sparkling splinters in it, and very often contains foible flats, and other extraneous substances in it.

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 gentilhommes, or rather of gentil, fine, fashionable, or becoming; and the Saxon man, q. d. hombys, or hompe lice natur. The same signification has the Italian gentilhommi, and the Spanish bidejos, or byedож, that is, the son of somebody, or of a person of note. If we go farther back, we shall find gentlemen 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 ingenious parents, and whose ancestors had never been slaves, or put to death by law. Thus Cicero, in his Topices, "gentiles sunt, qui iner se eundem funt nomine ab ingenius oriundos, quorum majorum nemo fivitum verius serviti, qui captivus sunt diminiqt, &c." Some hold that it was formed from "gentil, i. e. pagan; and that the ancient Franks, who conquered Gaul, which was then converted to Christianity, were called gentiles by the natives, as being yet heathians. Others relate that towards the declension of the Roman empire, as recorded by Ammianus Marcellinus, there were two companies of brave soldiers; the one called gentilis, and the other factionarius; and that it was hence we derived the names gentleman and esquire. This sentiment is confirmed by Pauly, who supposes the appellation gentilis and cossiers to have been transmitted to us from the Roman foldiery; it being to the gentiles and factionarii, who were the bravest of the foldiery, that the principal benefices and portions of lands were alligned. (See BENEMER.) The Gauls observing, that during the empire of the Romans, the factionarii and gentiles had the best tenements, or appointments of all the foldiery on the frontiers of the provinces, became infensibly accustomed to apply the same names, gentilhommes, and cossiers, to such as they found their kings gave the best provisions or appointments to. Pafy, Recol. bib. ii. cap. 15.

In fictitious, 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 free.

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 1 Hen. V.

We read that J. King斯顿 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 upstart, 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 also to the order of the Garter. Notitia Anglicana, p. 24. See Mr. Dodridge's Honour's Pedigree, p. 147.

Smith, De Reptil. Angl. & Forticell, vol. 82.

Guillim, in his chapter of gentlemen, says, that they have their beginning either of blood, as being born of worthy parents; or that they have done something, either in peace or war, whereby they deserve to bear arms, and be accounted gentlemen. He farther says, chap. xxiv. if a gentleman be bound apprentice to a merchant or other trader, he hath not thereby lost his gentility; and he doeth it may he 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 Bollen, some time mayor of London. To which 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.
Gentlemen. 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 confessor 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 verger, yeoman, and groom of the velvet; the first attends the dean and fal-dean; finds surplices and other necessaries for the chapel; the second has the whole care of the chapel; keeps the pew, and seats the nobility and gentrey; 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, Generous, is a good addition for the estate and degree of a woman, as generosus is for that of a man; and a gentlewoman be named spinster in any original writ, appeal, &c. it hath been held that the may abide, and quash the same. (2 Inst. 666.) 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.

Gentoo, in Modern History, according to the common acceptation of the term, denote the professors of the religion of the Brahmans (see Brahmans), who inhabit the country called Hindoostan, in the East Indies, from the word jtan, a region, and hind or hindu; which Ferdhach, as we learn from colonel Dow's translation of his History, appoises 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 styled themselves, but according to the idiom of the Shanckit, which they use, jnaddey, from jnana, a jucull; an animal common in their country, and deep, a large portion of land surrounded by the sea, or territabant, from khan, i. e. a continent, and tharrus, the name of one of the first Indian rajahs. 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 Maffulmen. The term Gentoo, or Gent, in the Shanckit dialect, denotes animal in general, and in its more confined sense mankind, and is never approbated particularly to such as follow the doctrines of Brahma. There 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 Gentoos, vie with the Chinese as to the antiquity of their nation. They reckon the duration of the world by four ages, or distinct ages; the first is the Suttee juge, or age of purity, which is said to have lasted about 3,200,000 years, during which the life of man was 100,000 years, and its stature twenty-one cubits; the second, the Tirtha juge, or the age in which one-third of mankind were reprobrates, which consisted of 2,400,000 years, when men lived to the age of 15,000 years; the third, the Dwaapar juge, in which half the human race became depraved, which endured to 600,000 years, when men's lives were reduced to 1,000 years; and fourthly, the Collee juge, in which all mankind were corrupted, or rather diminished, which the word colle imports. This is the present era, which they suppose will sublill for 400,000 years, of which near 5,000 are already past, and man's life in this period is limited to 100 years. It is suppos'd by many authors, that most of the Gentoo jugeurs or scriptures, were composed about the beginning of the Jollat juge, or col juge, of which, according to Mr. Dow, the year of Christ 799 was the 428th; but an objection occurs against this supposition, viz., that the slaters take no notice of the deluge; to which the Bramins reply, that all their scriptures were written before the time of Noah, and the deluge never extended to Hindoostan. Nevertheless it appears from the slaters themselves, that they claim a much higher antiquity than this; insinuates of which are recited by Mr. Halhead.

After all, it must be allowed, that perons of fagacity 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 consequently posterior to that event. Sir William Jones says, (Dissertation relating to Asia, vol. i. p. 199.) that the first corruption of the purest and oldest religion, which confitit in the worship of one God, the maker and governor of all things, was the fystem of the Indian theology, invented by the Brahmans, and prevailing in those territories, where the books of Mahabah, or Men, is at this time the standard of all religious and moral duties. In his preface to the "Institution of Men," (see Men) he says, they are suppos'd by the Brahmans to have been promulgated by Menn, the son or grandson of Brahma, or the first of created beings. This work he suppos'd to have been written about 350 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 Peria, where a great monarchy was established before the Aryan, called by the oriental historians the "Pihadadian dynasty;" and they say, that
that the first of these ancient monarchs, whom they call Mithab, or Merm, received from the creator a sacred book, in a heavenly language, meaning the "Vedas." (Diff. relating to Asia, vol. ii. p. 111.) This first monarch, they say, divided the people into four orders, the religious, the military, the commercial, and the servile. (Diff. &c. vol. i. p. 197.) In the reign of Huthang, the third of the Pindadian races, a reformation, he says, was made in the religious systems, when the complex polytheism of the preceding times was rejected, and religion was reduced to what is called "Satavani," which consisted chiefly in the worship of the sun, moon, and stars; but it is probable, that ancient, being a more simple form of religion than that of the Hindoos, must have preceded it. The laws of Mahabab, however, were retained, and his imperative veneration for fire. Upon this change, the followers of the old religion retired to Hinduastan, and their old religious laws forbid them ever to return, or to leave the country they now inhabit.

Another reformation, or change, in the system, was made, he says, under Gultiap, in the next, or "Kainate dynasty," thought to have been the same with Darius Hydaspis. This was effectuated by Zerathush, or Zoroaster; he introduced genius, or angels, propelling over months and days, new ceremonies in the veneration of fire, and gave out a new work, which he laid from heaven, but at the same time established the adoration of the Supreme Being. This work was laid 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 "Zendavadha," which ele. The followers of Zerathush, now called "Gebre," or "Parsi," perverted the religion immediately preceding; and these also took refuge in India, where they wrote a number of books, which are now very scarce. They reform, according to the account of Sir William Jones, the Hindoo sects of "Sauras," and "Sagunna," of which the last is very numerous at Benares.

Another innovator in the religion of the East, before the Christian era, was "Buddha," (see Doonit), generally supposed to have been the same with the Po (see Po) of the Chinese, the "Somomocodori" of Sham, the "Xaca" of Japan, and the "Odi" 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 528 B.C. His disciples were thought to have been the same with the "Somonhav," who were opposed to the Brahmanes of the Greek historians. But these Somonhav were, it is probable, of much greater antiquity, as was also Somomocodori. The followers of Buddha gave great umbrage to the Brahmas, who never ceased to persecute them till they had effected their extinction from Hindoostan by fire and sword, about 400 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 Brahmas of Cais made Buddha the 9th avatar or transformation of Vishwok. This religion is that which prevails in India beyond the Ganges; it was received in China A. D. 65, and is 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 present-existence of souls, their futurity, and re-action independently of bodies, and their transmission 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 abjurations, and the same idea of the use of corporeal substances for the exaltation of soul.

There can be no doubt of the very high antiquity of the religion of the Hindoos, 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 Asia, 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 at present they are in total ignorance of each other. According to Eusebius and Syncellus, some people from the river Indus settled in the vicinity of Egypt in the reign of Amenophis, the father of Sedoitis, and many Egyptians, banished by their princes, settled in other countries, and came to 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 Eziouvedan, 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 is divided into 30 degrees. Moreover, both the Egyptians and Hindoos had also the same division of time into weeks, and they denominated each day by the names of the same planets. The resemblance between the oriental and occidental systems extends much farther than Egypt. The office and power of the Brahmas in the northern parts of Europe did not differ much from those of the Brahmas; 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 Persians and Hindoos, and they wrote alternately to the right hand and left. (See Etruscans.) 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 idea 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 animation. 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 Chaos; 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 much used in the Egyptian worship, and from Egypt it was carried into Greece, where it was used in the mysteries of Bacchus. Besides, the licentious postures of the Egyptian women before their god Apis, were the same with those of the Hindoo women, before their idols, (see Brahmans); and, moreover, the Hindoos chule their sacred bulls 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 Hindoo 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 sytem, very similar to that of the present Hindoos, must have been of very great antiquity, and prior to the general dispersion of mankind. For though similar situations may lead to similar sentiments, and corresponding practices, the above-mentioned similarity, which might be traced in a much greater number of influences, 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 allusions 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 preferred 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; their attention being ingrossed by inferior objects of worship. Some of their deprivations of the deity are just, 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 Brahman.) 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 sytem the first production of the Supreme Being was something similar to the chaos of Moses, 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 Bouget (Ceremonies of Religion, p. 48.) bears some resemblance to the masonic history of Paradise. The Hindoos say that the first man was called “Adam,” and the first woman “Manana.” 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 greatly 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 unambiguous tradition of an universal deluge; and according to the “Purans,” 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 “Antiquity Researches.” The 4th and 5th “avatar” of the Hindoos, as for W. Jones says (Diff. ex. v. p. 115) relate to the punishment of impiety, and the humiliation of the proud; and refer, as he thinks, to the deluges from Babel. In the “Bhagavady” there are besides the masonic account of the deluge, the principal circumstances of the history of Ikma, and the sacrifice of Iasa. 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 institutes contained in the collection of the Gentoo laws, which we shall presently notice, are interwoven with the religion of the Gentooos, and revered as of the highest authority. The curious reader will discover an alluring similarity between the institutes of this code and many of the ordinances of the Jewish law, between the character of the Brahmins or priests, and the Levites; and between the ceremony of the scape-goat, under the Mosaic dispensation, and a Gentoo ceremony, called the “golmanned jag,” 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 obsolete 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 Brahmins, who are the priests and legislators of the country, have renounced all the secular and executive power into the hands of another cast or tribe; and no Brahmin has been properly capable of the magistracy since the time of the sattegogue; 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 Brahmin 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 exiled 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 exilt 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 spiritual to the corporeal part of man is the fundamental doctrine of the Hindoo sytem; and hence springs the satisfaction which the Hindoo always expresses on the separation of them. From the Indian philosophy it is probable that the Manicheans had their idea of an original difference in souls, force being morally 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 asserted in the “Institutes of Menu.”
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, as other renovation of the four journies shall commence, upon the dissolution of the present. They imagine fix different spheres above this earth, the highest of which, called fuzee, is the residence of Brhimah, and his particular favourites. This sphere is the haunt of those men who never uttered a falsehood, and of those women who have voluntarily chastised themselves with their husbands; the propriety of which practice is expressly enjoined in the code of the Gentoos laws.

This code, printed by the East India company in 1776, is a very curious collection of Hindu jurisprudence, which was compiled by the most experienced pandits, or lawyers, from curious originals in the Sanscrit 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 Gentoos theology, proceeded from the four different members of Brhimah, the supposed immediate agent of the creation under the spirit of the Almight. These tribes are the Bramins, which proceeded from his mouth, and whose office is to pray, read, instruct, and conduct the sacrifices; the Chelethees, which proceeded from his arms, whose office is to draw the bow, to fight, and to govern; the Bice, proceeding from the belly or thighs, who are to provide the necessaries of life by agriculture and traffic; and the Sooder from the feet, which are ordained to labour, serve, and travel. See CAST.

Few Christians, says the translator of the Gentoos Code, have expressed themselves with a more becoming reverence of the grand and impartial designs 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 Bramins, that God's all-merciful power would not have permitted such a number of different religions, if he had not found a plenty in beholding their varieties.

Mr. Holwell, and even Mr. Dow, attempt to elucidate the Hindoos from the charge of polytheism and idolatry. "Let us well assured," says the latter, "that whatever 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 directed; 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 subordinate deities and genii, of which every part of the visible world was the seat and temple. These intelligences did not barely 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 deprecating their anger, and soliciting their favours. Hence proceeded a great variety of whimsical and absurd, and also of cruel and dreadful, as well as impure, rites. The description of the Hindoos for the images of their gods subjects them jujilly to the charge of idolatry and polytheism; although the learned Bramins pretend, that they do not worship the visible idol, but the invisible being represented by it. Mr. Sommert says that, besides those whom the Hindoos place in the rank of gods, they have also "fauns," whose pictures they place in their temples, and that they address their 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 deities besides the Supreme Being. The worship of the fun, says Sir W. Jones (Diff. &c. v. i. p. 481.) is principally recommended in the Vedas. The "Institutes of Menu" say, that "the Supreme Being created an assemblage of inferior deities, and divine attributes, and pure souls, and a number of genii exquisitely delicate." In this work mention is also made of "orders of demi-gods that are wafted in airy cars, semi of the rigus and lunar mantic, &c." The worship paid to the deities, or anicones, is a great article in the Sutrin, and it 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 European 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 ones. Thus, their deities, Odin the god of war, Frea his wife, and Thor the god of thunder, were the principal objects of worship to all the Scand-navians.

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 Bramins exterminated the Sammanians, and the followers of Boddhis, with fire and sword, leaving 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 inflicts of the whole nation. Such also 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 Bramins themselves are cruel and malignant, where their religion is concerned. Nevertheles, 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; so that though they may have gone together at the first, they must have separated at a very early period. The Hindoos never worshipped 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 fables 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 old Sytem of polytheism and idolatry. It is evidently a refinement on something much more simple, and this seems to have been the system of the "Samhans," whom the Greek writers mention as a sect of philosophers in India, opposed to the "Brahmanas," and to be the same as those who are now called "Sahamans" in Siberia. See SAMHANAS.

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 castes, are condemned to continual transmigrations, till they are regenerated in the bodies of men. The fame 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 subject 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 ona, 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 ona, on the pronunciation of which so much is supposed to depend, signifies, according to Sir W. Jones, Brahman, Vichon, and Sor; or the three powers of creation, preservation, and destruction. This mythical word, he conjectures, may be the Egyptian On, commonly supposed to mean the sun, and by the ancient idolaters the solar fire. The religion of the Hindoos consists principally in oblations to the gods, i.e. to the inferior deities, and to the manes of their ancestors; and these oblations are accompanied with many frivolous ceremonies. Moreover, a great part of their religion consists in the sacrifices 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 distant rivers; and they generally prefer the Ganges. In their pilgrimages, they practice singular austerity. Their feats in honour of different deities are of long duration, and are very strictly observed; and they are thought to have singular efficacy in effacing all sins. 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 flaying on the ground for the wheels to pass over them, and crush them to death. But the most affecting instances of involuntary death are those of the Hindoo women, who burn themselves alive with the bodies of their deceased husbands. In this way of terminating life they indulge the hope of attaining the same state 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 persons of high rank and celebrity, these victims of superlition, voluntary or involuntary, are sometimes very numerous. At the death of a king of Trancore, no less than 600 of his concubines leaped into the flames, and 400 burned themselves at the funeral of a vaque, of Madura. (Maurice's Ind. Antiq, vol. ii. p. 165.) The Hindoo religion, which has been extolled as the midst of all religions, formerly enjoined and countenanced human sacrifice; and Sir William Jones says, that the ancient Hindoo sacrifice of the Hindoos was that of a man, a bull, and a horse. Among other superlitions notions and practices prevalent among the Hindoos, we may mention their excessive veneration for the cow, and also for the elements of fire and water. Penances of a singular and severe nature were enjoined for killing cows without malice; and if this crime was maliciously committed, it admitted of no expiation whatever. Mr. Wilkins informs us, (Sketches relating to the history, &c. 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 murtial altar flames, and the funeral pile is kindled. Their veneration for water, especially that of the Ganges, has already been mentioned; and performs clufs to the indians from an idea, that the soul passing through the water, as it leaves the body, is purged from its impurities.

The Hindoo religion is little, if at all, more unexceptionable than the ancient Egyptian, with regard to the extravagance and indecency of many of its ceremonies. Indulges occur at their pagodas, which we have already noticed under the article BRACHMANS, and which it is needless here to repeat. (See also TAGODA.) 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 producing somewhat of divinity, they have been deemed proper texts of guilt, or of innocence. Hence has proceeded the trial by Ordal: which see. With regard to the Hindoo doctrine of a future state, Mr. Dow says, that men first sit 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 Vedas is only intended as a hog-bear to the vulgar; agreeably to the doctrine of the Greek philosophers. On the other hand, Mr. Holwell, 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 "Onderah" for ever. According to another account of the religion of Malabar, they who destroy themselves go neither to heaven nor hell, but flyroll among the "Spirits," 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 grass and raw fish. According to the Indians, says P. Dilla Valle, some very wicked men become devils. To conclude our account of the Hindoos, or Gentooos, we observe, that notwithstanding the
the unreasonable fields 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 fields, we find, even too great, is laid on the duties to parents; so as to supersede the obligation, and to depreciate the importance of other duties. Upon comparing the Hindu systen with that of Moses, the absurdity of the former is as apparent as the superior wisdom of the latter. With the Hindus we perceive the rudiments, and more than the rudiments, of most of the arts and sciences, especially of that of astronomy, of which most other nations are wholly ignorant. And yet while the Hebrews made no discoveries in science, they had a religion perfectly rational; and that of the Hindus was absurd in the extreme. This, therefore, is an argument of the internal kind in favour of the divine origin of the Hebrew religion, almost as irreproachable as any argument from miracles. From the preceding sketch of the Hindu religion, we must be led to acknowledge the necessity and utility of a divine revelation.

Those who are deliberate of being farther acquainted with the principles, manners, and various institutes of the Gentoo, may consult Holwell’s Interesting historical Events, &c. 1766. Dow’s History of Hindoostan, 4to. 1768. and the Code of Gentoo Laws. Prieckley’s Comparison of the Institutions of Moses with those of the Hindus and other Ancient Nations, 8vo. Northumberland, in America, 1799. For a further account of the religious tenets and practices of the Gentoo, see Brachmans. See also Shastanah and Viedan.

GEN-TSING, in Geography, a town of China, in Setehu; 87 miles N.W. of Hoecho.

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

The Jesuit Roswey, in his Omanofican, 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 Whitmas, 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 Athiopie church, scrupulously attached to the ancient ceremonies, still retains that of not kneeling at divine service. The Ruffians esteem it an indecent posture to worship God on their knees. Add, that the Jews usually prayed standing. Roswey gives the reasons of the prohibition of genuflexion on Sundays, &c. from St. Bafil, Anaphalaeus. St. Justin, &c.

Baronius is of opinion, that genuflexion was not established in the year of Christ 58, from that palliaxe in Acts xx. 56, 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 praclice of genuflexion so far, that some of them had worn cayolites in the floor where they prayed: and St. Jerome relates of St. James, that he had contrived a hierolind on his knees equal to that of camels.

GENUS, in Systematic Botany, from γένος, a family, implies one or more species of plants, differing essentially in their parts of fructification 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 fructification 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 Linnaeus 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. Botanists of the French school, on the contrary, maintain that all such distinctions and differences are merely arbitrary, serving 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 scrupulously contend for a natural system of arrangement, but object to the Linnaean method, whose facility cannot be disputed, merely because it is not natural, terming it in their language lex naturae. 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 genera, and far less to classified, distinctions. The latter indeed have been scarcely found capable of definition, or in no vague a manner as to leave us most in doubt where precision is most wanted; and were it not for that intuitive, or least practical, perception of affinities and differences, which is, by the French, contended to be inscrutable in judging of genera, we could certainly come at no knowledge of most of the natural orders of these learned writers.

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 Trops, whose singular quadrangular nut is armed with spines that once constituted the calyx-leaves in Paragia, so well marked by the fringes and lacid balls that border its nectaries; in Solanum with its many-cleft monopetalous corolla, and Eleusine, whose polypetalous one is similarly clothed in Griffita, the only known instance of a papilionaceous flower with such a drupée; not to mention a great number besides. Inflammation of good natural genera, distinguished by some one essential character from all others in their natural order, are found in Echium, whose irregular corolla keeps it distinct from all others of the Aphi rodia; Corence, known from all other gracies by its remarkable involucrum; Pinpinella distinguished from its allies by the globose figmin; Remana, by the nectariferous pore in the cowl of each petal; Vella by the prominent dilated partition of its pouch, extending twice as far as the valves; to which may be added many genera of the class Didynamia Gymnospermaea, see Smith’s introd. to Botany, 434. The Linnaean lepidodria Polyneca affords one of the most perfect examples possible 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, inflorescence, or general appearance, while their fruit affords clear essential generic characters. The natural family of Orchizes, as arranged by Swartz and Brown, come very near the same point of perfection, but their differences of habit are less obvious. Such instances ought to stimulate the philosophical botanist to 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 indissoluble origin, and gradual improvement of generic knowledge among botanists. In an early stage of the science, some general affiliations were formed, though founded on vague and unphilosophical principles. The idea and name of a rofe soon embraced many different species, and hence the dog-rose, the white-rose, the damask-rose, &c., were distinguished from one another, and a fort of generic and specific nomenclature arose, finally extended systematically to every plant by Linnaeus. Calpin Baulin in his Linneum, anno 1623, first distributed 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 Geyer, 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 referred 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 their generic names.

Linnaeus did not at once hit upon the better 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 Genus Plantarum. At length, in the sixth edition of his Systema Nature, published in 1737, he undertook a Synopsis table of the chief 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, and the followers of his system of classification, but even by the celebrated Jussieu and his scholars, who have widely differed from the learned Swede as to other principles of arrangement, and who have certainly not improved upon his style of definition, terminology, and nomenclature. Jussieu indeed has, like Gowan, 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 Genus Plantarum, 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 system, are called fictitious; these are much better extended so as to include sufficient marks of discrimination between the genus under consideration and every other, and they then become the affinities characters above-mentioned, which ought in every systematical botanical work to stand at the head of each genus, or at least to be indicated by a reference. Lamarck, though much disposed to criticise 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 affirms entirely to the Linnaean maxim, founded on the good sense and penetration of Conrad Geyer, 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 exceptional, 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 dissembled 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, although 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 themselves 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 matrix 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 it. Thus, animal is said to be 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 trapezium; and so, likewise, is sublimate in respect of sublimates, which is body; and thinking sublimate, which is mind.

A good definition, say the schoolmen, confides 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 ran, being, will equally hold of the body.

The schoolmen define the genus logicum to be, an universal which is predicabie of several things of different species; and divide it into two kinds: the one, the fiumum, which is the highest, or most general; and has nothing above it to respect as a genus; the other, the fakulter, which they likewise call divus.

Genus fiumum 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 subprocessing of themselves, substance 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 substance.

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

Genus, fabulorum, 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 remotum, remote, where between it and its species there is another genus; and proximnum, 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 mutual, rhetoric, botany, anatomy, &c. &c. &c.

Genus, in Mujic. See Genera.

Genus. By the word 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 clafs 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 consists 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 descending 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 hence to commend and thus the excellence of virtue in general, with a view to render that virtue more amiable. For since every species consists in 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, necessarily, 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.

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

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

Genzgen, a town of France, in the department of the Rhone and Mollon; 5 miles N. E. of Creutznach.

GEOCENTRIC, of earth, and centro, centre, in Astronomia, 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 aforesaid 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 Plut. XIII Astronomia, fig. 116, the angle $\alpha$ is the measure of that planet's geocentric latitude; when the earth is in $\beta$ and the angle $\alpha + \beta$ the measure of it when the earth is in $\gamma$.

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, geodesia, formed of $\gamma$, terra, earth, and $\delta$, divide, I 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, grounds, roads, countries, provinces, &c.

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

Geodesia, in Natural History, is applied to a universe of hay, corn, &c. See Stack.


Gen. Ch. Col. Periarch of one leaf, inferior; bell-shaped; five-leaf half way down; its two upper segments diverging, spreading. Cor. papilionaceous; standard roundish, emarginate, flat, reflexed; wings equal to it in length, obtuse, concave; keel compressed, the length and shape of the wings. Stamina in two forms (ingle and nine-leaf), the style of the keel, orers roundish. Pith. Germf superior, roundish; style awl-shaped; stigma obtuse. Paris. 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.


(Umari);
"Spinos. Leaves oblong, obtuse." — Native of Brazil, and the country about Carthage. In woods on a sandy soil near the sea. Jacquin describes it as an indelicate tree, twelve feet high, with a few spines on the trunk and larger branches, which are unshaped, and generally an inch long. Leaves pinnate, about seven pair, with an odd one, of oblong, obtuse, smooth, entire leaves, on a stalk four inches in length. Clusters nearly as long, axillary, simple, dense. Flowers on short partial rachis; their colour a dirty orange, and their scent extremely powerful and offensive. Fruit like that of an almond in its coat, slightly downy, greenish-yellow; the pulp soft, sweet, but of a nauseous smell, yellowish, staining the hands with a rusty hue, very difficult to wash off. This coat adheres firmly to the nut, whose kernel is white, mealy and altrigent. Jacquin was fully surprised at meeting, for the first time, with a drupa to a papillaceous flower, but he judiciously named it, in spite of some preconceived theory.


3. G. insinui. Swartz. Prod. 166. Woodv. Med. Bot. t. 112. (Cabbage-bark tree of Jamaica; Wright in Phil. Trans. v. 67. 527. t. 15.) — "Without spines. Leaves lanceolate." — Native of Jamaica and Martinico. A tall tree, whose wood is white, and so tough as to be preferred beyond all others for the shafts of carriages. The bark is a 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 leaves, about three inches long. Flowers light-red, in very large much-branched, terminal, downy panicles. Fruit the size of a small plum.

GEOFFREY, or GEOFFROY, insermis, cabbage-bark tree, or warm-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. Phylic. 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 has been 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, and extract; and the manner of preparing, and exhibiting thefes, are particularly stated by Dr. Wright. For the decoction, take fresh dried or well-prepared 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 balneo maris to the proper confidence; it must be continually stirred, as otherwise the refuse part rises to the top, and on this, probably, its efficacy depends. The powder of well dried bark is calyce made, and looks like jupan, 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 drank 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, several times, and kept in a state of fermentation; but some fatal accidents have attended the imprudent use of it, chiefly from overdoing the medicine.

Phil. Trans. vol xlvii. p. 597.

GEORGEY of Monmouth, in Biographia, an early historian of our own country, who flourished about the middle of the 13th 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 preferment.

As an historian he is known by his "Chronicon quinque Historia Britannim." This work has been frequently reprinted. Bayle. Moreri. New Anmual Regist. vol. iv.

GEORGEY, ETIPHEE FRANCOIS, a physician, was born at Paris on the 15th of February, 1672. His father was a professed apothecary, and had held the offices of sheriff and constable. While the young Georgey was perfecting his studies under his paternal roof, his father held regular scientific meetings, at which Caffini attended with his pupils, Schahoff with his machines, and Joublet with his magnets, and at which Du Verney performed his experiments, and Hoenberg 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 bacheler in 1702, and that of doctor in 1704. His disposition was mild
mild and kind to his patients, who, on his outset in practice, were alarmed by the solemn air which his sympathy for their sufferings occasioned him to assume, but his reputation from increased, and he was called in consultation even by the most distinguished members of the profession. In 1720, he was appointed by Louis XIV. to the professorship of medicine, vacant 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 more 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 profession, 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 deans, but never accomplished; namely, a pharmacopoeia, containing a collection of the compound medicines requisite to be kept by apothecaries, "Le Code Medicamentaire 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 la Matiere Medicale, ou elementary de l'Alchimie Historique, virtute, et effet," Paris 1741, 2 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 1733, and the remainder in 3 vols. in 1753. Arnaud de Nobleville, and Salerne, physicians of Orleans, published a continuation of this work, under the title of "Histoire Naturelle des Animaux," Paris 1756, 1757, in 6 vols. 12mo, which is deemed not unworthy to be ranked with the production of Geoffroy. Eloy. Dict. Hist.

GEOGLOSSUM, in Botany, from γογγυς, the earth, and γλωςις, the tongue. Porron Syn. Fungi. 607. Class and order, Cryptogamia Fungi. Nat. Ord. Fungi.—See. class. forms. Efl. Ch. Receptacle club-shaped, fleshy, generally compressed, short, with a prominent margin next to the stalk. This genus of Fungi is founded by Peiron on the Clavaria oligoblastiodes 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. It enumerates and defines seven species. His G. bisulcatus is Clavaria oligoblastiodes of Sowerby's Fungi, t. 93; his G. chlorum is a smaller and smooth fungus, very like the fructifying spike of the fern 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 γεω, terra, earth, and γραφειν, I write, I describe; the doctrine or knowledge of the earth, both as in itself and as to its situations; 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 choreography, it is distinguished, at the whole from a part.

Golitsa considers geography as either exterior or interior: but Varennes 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, land, sea, &c. And this may be subdivided into alpabic geography, which respects the body of the earth itself, its parts and peculiar properties, &c., relative, which accounts for the appearance and accident, 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, rivers, seas, waters, plants, and animals, &c. therein; as also their climates, fevers, 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, considered by 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 reformation 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 natural, 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; sacred, describing the 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 substance. 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 Lydia excepted.

It appears (see Phil. Geog. I. c. 9.) that the early geographers, being delirious of mathematical in-
from the form and colour of certain animals which were to be found in these different countries. The appearance of negroes, 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 groser manner of dividing their climates must be considered as the first rude outline of geography in the more illiterate ages of the world. However this be, the Chaldeans 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 Necho I., who conquered Egypt.

This Egyptian king, says Enniathius in his epitome, prefixed to his commentary on Dionysius's Megaran, 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 astonishment. The Jews also seem to have had surveyors among them; and hence some have imagined that they had made a map of the Holy Land, when they gave the different portions to the nine tribes at Shiloh. (John xviii. 4. 8. 9.) And Josaphus 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 presume that a geometrical survey was then made of the Holy Land; though we cannot absolutely determine whether their measurement 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 longest and shortest 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 in proportion to the height of the gnomon. For an account of this invention, and of the method of applying it, see Gnomon.

From the days of Thales and his immediate successors, who flourished in the fifth 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 system of the world, as they placed the sun in the centre, and inferred 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 Euclides, who observed the summer solstice at Athens on a day corresponding to the 25th of June, 432 years B. C. This solstitial observation might 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 as 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 Timocles and Arisdillus, who began to observe 295 years B. C., were the first who introduced the manner of determining the position of the stars, according to their longitudes and latitudes 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: that is, it was after the precession of the equinoxes was fully established by Ptolemy, that the longitudes and latitudes of the stars were uniformly referred to the equatorial instead of the equator. It was therefore, by an early transition, that Hipparchus would be led to adopt and dispose 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 laid the solid foundation of geography by uniting it to astronomy, and thus rendering its principles self-evident and invariable.

Pliny (N. H. I. ii. 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 at once 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.
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were measured or surveyed with the utmost care by the Romans."

Vegetius De Re Mil. (I. iii. c.6) has well described the surveys of particular provinces, with which every Roman general was regularly furnished before his march. "Ethi- cus, in the preface to his "Cosmographia," further informs us, that Julius Caesar 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 Polyeuctus, each of whom was appointed to survey a different division of the empire. This survey commenced in the conship of Julius Caesar and Marc Antony, in the year 44 B.C., and continued for twenty-five years one month and ten days, to the con- ship of Septimius Severus and Lucrinus Cnina, in the year 19 B.C. The Roman itineraries that are still extant, evidently show with what accuracy their surveys were made in every province; and Pliny has filled the 36, 46, and 46th books of his Natural History with the geographical distances that were thus measured.

Before the Romans engaged in this business, Necho, king of Egypt, ordered the Phoenicians to make a survey of the whole coast of Africa; which they accomplished in three years; Darius procured the Ethiopic sea, and the mouth of the Indus, to be surveyed. Thales of Miletus, Anaximander his disciple, who is said to have constructed the first map; Democritus, Eudoxus, &c., who made the use of maps common in Greece; Aristocrates of Miletus, who presented to Chrenon, king of Sparta, a table of bals, on which he had described the known earth, with its seas and rivers; and other Greeks, availing themselves of the elements derived from the Chaldeans and Egyptians, prosecuted 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 humbled the pride and boast of Alcibiades, by defining him to point out his territories in Attica in a map; and Pliny relates (I. vi. c. 17) that Alexander, in his expedition into Asia, took two geographers, Dio- setus and Acheta, to measure and describe 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 are sufferers by war, geography and fortifi- cation have been improved thereby. We also learn from Strabo, that a copy of Alexander's survey was given by Xenocrates, his treasurer, to Patrocles the geographer, who, as Pliny informs us, was an immortal of the schools of Socrates and An- tieuchus. His book on geography is often quoted both by Strabo and Pliny: and it appears that this author furnished Eratothenes with the principal materials and authorities for constructing the oriental part of his map of the then known world. For the voyages of Patrocles under Socrates, upon the Caspian sea, and elsewhere, were a kind of supplement to those measurements given by Bucrot and Dionysus already mentioned, and by Nearchus and Onesicritus, the two admirals who were employed under Alex- ander, and therefore Pliny quotes them immediately after. It appears likewise from the same passage, that Megasthenes and Dionysius were two surveyors sent into India by Ptolemy Philadelpbus, for the purposes of geography: and their authority was sometimes set in opposition to Patrocles by Hipparchus, in his criticism upon Erato- thenes's geography. (Strabo, lib. ii. passim.) From the memorable era of Alexander's expedition and conquest, and those of his immediate successors, geography began to assume a new face and form. For Eratothenes, who is de-

termediately considered as the great father of chronology, distin-
guished himself by the cultivation of the science of geo-

graphy. (See the article Eratothenes.)

We shall now recite the names of some of the principal persons who have contributed to the improvement of geography. Pytheas, the famous geographer of Marseille, flourished in the time of Alexander; and Aristotle seems to have been no less conversant with geography than philosophy: after Alexander, Seleucus Nicanor, Theophrastus, the disciple of Eratothenes, who published three books of geographical commentaries, and corrected a chart of Anaxi-

mander, Hipparchus, who corrected the observations of Eratothenes, and thus furnished occasion for a dispute which greatly contributed to the improvement of geogra-

phy, Agatharcides of Chiusus, who lived under Ptolemy Philomotor, and Meles, who, about fifty years after him, published a description of the whole world; Artemi-
dorus of Ephesus, who gave a description of the earth in eleven books, often cited by Strabo and Pliny, and many others, whose names it would be tedious to enumerate, distinguished themselves by the cultivation and improvement of this science. Geography was transferred, with the other arts, from Greece to Rome, as we have already mentioned. Varro's works contain many geographical remarks: Zenodorus, Theodorus and Polyeuctus were em-

ployed under the conjubium of Julius Caesar and Marc Antony, in surveying and measuring the globe. (See the preceding part of this article.) The commentaries of Caesar are well known. Ptolemy encouraged Posidonius, who made an imperfect memoir of the earth by celestial observations, in different places under the same meridian. (See Degree). Augustus was a distinguished patron and promoter of this science; under whom Strabo published his geography. And the taste for the study and advance-

ment of geography was greatly encouraged under Tibnius, Claudius, Vespasian, Domitian, and Adrian. Iulius of Charax, who lived to the commencement of the first century of the Christian era; Pomponius Mela, who published a book entitled "De Situ Orbis"; Metius Pomponianus, who, having depicted the earth on a parchment, fell a sacrifice to the jealousy of Domitian, the emperor suspecting that he aimed at the empire; Pliny the naturalist, who has de-

scribed the countries known in his time in the third, fourth, fifth and sixth books of his Natural History; Marinus the Tyrian, who corrected and enlarged the discoveries of preceding geographers; and the emperor Antonius, de-

serve particular mention. This abstract of the history of ancient geographers, notwithstanding whole successive peri-

ods geography was still in a very imperfect state, brings us to a period, about the 150th year of the Christian era, in which Ptolemy of Alexandria contributed greatly to the improvement of this science, by a more ample and accurate description of the terrestrial globe than any had yet given of it. He availed himself of numerous observations and ancient charts; he corrected the mistakes and supplied many defects of others; and by reducing the distances of places on the earth to degrees and minutes, after the manner of Posidonius, making use of the degrees of longitude and latitude, and setting the situation of places by astronomical observations, he reduced geography into a regular system, and laid a foundation for those further discoveries and improvements, which naturally resulted from the progressive, and at present advanced state of geometry, astrono-

mtry, navigation, and commerce.

In order to form a proper judgment of the benefits accruing to geography from the labours of Ptolemy, we ought to take into account the materials that were extant in his
time, and which he had actually in his possession. These
confided 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-
cerent astronomers at the times of the equinoxes and solstices;
"calculations" founded upon the length of the longest day;
"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-day and gueas-
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, expounding 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 observa-
tions sufficient to determine all the latitudes and longitudes
which he has given; so that 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-
cecuting 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 information,
and not from ignorance or inattention on his own part.
Nevertheless, Ricciolus, Cellarius, Paul Mulerus, and Sal-
narius have been too severe in their criticism and cenfures;
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 on the point of 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-
pounced 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 unexceptionable
authority. These mistakes, thus introduced, maintained
their places in all maps, by a kind of unquestioned prescrip-
tion, even to the commencement of the last century, and it
unequally happened that these errors related to that part
of the world which was best known to the ancient Greeks and
Romans. Thus, Ptolemy states the latitude of Byzantium
to be 43° 5' instead of 41° 1', the latitude according to mo-
dern observations. In this particular mistake was misled
by Hipparchus, who is mentioned by Strabo (i. i.) as
having visited Byzantium, and made this observation in per-
son. The latitude of Marseilles, which was supposed to
be under the same parallel with Byzantium, was not, however,
to such a mistake, as by modern observations it has been
found to be 43° 17' 45"; and allowance being made for the
now acknowledged diminution of the obliquity of the
ecliptic, (see Ecliptic,) 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
erroneous latitude seems to have been copied or transcribed
from a passage in Strabo (i. ii.), in which it is stated that
Carthage, the gnomon has the same proportion to the
equinoctial shadow, which 11 has to 1' , 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 Ifiss, where Alexandria, or Scanderoon, now
stands, whole ancient name was Alexandria ad Ifium.
The difference of longitude of Alexandria ad Ifium and Gibraltar,
according to Ptolemy, is 62° 1'; whereas the difference of longitude
between these two places, according to the latest
observations, is 41° 28', and Ptolemy's error is 20° 52'. 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 Dioctefian, Conftantin, and
Maximian, &c. Under the emperor Theodosius the pro-
cvincial and itinerary chart or table, since known under
the name of Peutinger, was digested and formed; and the lat-
work, that ought to be chiefly with those of the ancients,
was the Notitia Imperii, attributed to Ethicus, 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-
graphy, were Almamom, caliph of Babylon, and Abulgeda,
a Syrian prince. (See Degree.) After the revival of
learning in Europe, and particularly during the two last
centuries, geography has derived very considerable accessions
from travel, 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 auspices of M. de Peirset in 1635; and he also, with a di-
rect view of correcting the errors in the longitudes of
different places, took particular pains to get observations made
at Marseilles, Aleppo, and Grand Cairo, of an eclipse
of the moon, which happened August 27th 1635. Before
that time the difference of longitude between Marseilles and
Aleppo had been supposed to be 45°, but by these ob-
servations it was found only to amount to 30° (the real dif-
ference has been since found to be 31° 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 ablest astronomers soon found that from these eclipses,
have 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,
thus Fournier, Kircher, and even Ricciolus, who had
connected the observations of no less than 56 eclipses of the
sun and moon, between the years 1560 and 1658, gave up the

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the correction of geography by the application of eclipses of the sun and moon alone, as a frutile and desperate undertaking. At length recourse was had to the eclipses of the satellites of Jupiter, and they were found effectual 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 Horderus, composed ephemerides of their motions, nothing of that sort was found to be sufficiently accurate for the purposes of longitude, till M. Cassini published his tables of the revolutions and eclipses of the satellites in 1668. The first opportunity of effectually applying this theory to the rectifying of geography was suggested by M. Cassini, and taken by M. Picard in 1671 and 1672, who, at the observatory of Tycho Brahe at Uranibargh, observed two conjunctions and three eclipses of the first satellite of Jupiter, which were afterwards compared with the fame observed by M. Cassini 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 the limits of boundaries than it was supposed, according to their former maps, to have occupied; inasmuch that Lewis XIV. jealously feared, that he found by their journey he had suffered a loss of part of his kingdom. Other academicians determined by the same method the longitude of the cities of Goree, near cape Verd, on the coast of Africa, and of Guadaloupe and Martinico in the West Indies. And when M. Cassini 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 Scanderonoo, 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 as accurate 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 is thus unfetted to a more speedy and certain determination. Instruments of observation have also been improved; and time-pieces have been constructed, free in a great degree from the error and uncertainty of those that were formerly in use. See CHRONOMETER and CLOCK. See also Ephemeris and Longitude.

For a fuller account of the history of ancient geography see the preface to Bertius's edition of Ptolomey's Theatron Geographiae Veteris, fol. For a brief history of the rise and progress of geography, see Varinius's Geog. and the Introduction to Blaixe's Tables of Chronology.

The art, however, must needs have 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 Magellanica; 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 Ptolomey's eight books; among the moderns are, Johannes de Sacroboce, De Sphaera, with Clavius's comment; Riccioli's, Geographia and Hydrographia Reformata; Waghelius's Speculum Terrae; Dechales's Geography, in his Mundus Mathematicus; and above all, Varinius's Geographia, with Jorn's additions; to which may be added, Leibnitz's Elementa Geographiae generalis; Suring's Compendium Geographicum; Wallis's Geography, in his Elementa Mathematica; the Preface to M. Robur's Atlas; the introduction to Budaich's Geography; the works of Duval, Breu, Delille, D'Anville, Boume, Briache, Mentelle, the Sansons, Homann, Muller, and Martinieri; Pinkerton's Geography, Gordon's, Salmon's and Guthrie's Grammars, &c. Hornit Orb. ant. delineation, Clavius, Cellarius, Pomp. Molia, &c. &c.

The reader will find under the appropriate terms in this Cyclopaedia, such information concerning the subjects which they express, 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, to avoid that which would be, in the future, to transcribe articles that will be found in their proper places. See ALTITUDE, ASPHICLON, ANTIPODES, ALTITUDES, CIRCLES, CLIMATE, COLORS, DEGREES, EARTH, ECLIPSE, EQUATOR, EQUINOCTIAL, GLOBE, HORIZON, LATITUDE, LONGITUDE, MAP, MERIDIAN, MOUNTAIN, OCEAN, PARALLELS, PERILOM, POLE, SPHERE, SPHÈRE OBLIQUE, PARALLEL, and RIGUT, TROPICS, ZONES, &c. &c. &c.

GEOLOGY, in a strict sense of the word, or Geog

ography, 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 the distinguished rank it now holds among the sciences to the celebrated professor of Freiburg, who has however separated geology, or the science to which the above-mentioned definition applies, from geology in the sense in which the word is taken by him; considering the latter as a merely speculative branch of knowledge, and as having nearly the same relation to the former which astronomy has to arithmetic. While geology, left unattended upon enquiring into the primordial state of the globe, is contented with the merit 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 Wernher) aspires 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 some of the theories of extravagant notions, known by the appellation of theories of the earth (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 substances, the origin of which they undertook to elucidate. Nothing is better calculated to suffer false than to be mentioned as the creator of a theory of the earth; nothing safer, with a moderate share of imagination and less knowledge of facts, than to frame a new theory sufficiently distinct from all its rivals to be noticed; and nothing safer than to broach opinions which, though they cannot be proved true by their authors,
are certain to be left unfretted by others. And who would be daring to waste 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 finds its need of clarification to affit 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 Mosaic account, have in latter times been presented to the world by a few unprejudiced geognosts. Instead of prematurely endeavouring to accommodate the little geognostic knowledge we possess to the events hinted at in the sacred history of creation, which was by no means intended for a fable of geology, we should commence our researches in this field of knowledge with subjecting to a careful examination what nature produces as it were under our eyes, such as the manifold alterations that have taken place in the physiography 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 causes! How few 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 circumstancies 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 found principles of logic and induction. But researches of this nature require what few are inclined to bellow upon them, the patient observation of many years; 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 gypsum-formation of that part of France that this incomparable naturalist has found the ossesous remains of no less than fifteen quadrupeds, unlike any species now known to exist. Have these organized 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 causes to be assigned 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 profess 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 Lehmans, Deluc, Dolomieu, and particularly Saffiure, who, in his celebrated agenda, has proved how well he knew the desiderata 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 multitude of materials furnished by an intimate acquaintance with the internal structure of a considerable and highly interesting tract of country, is entirely due to Werner; who, being afflicted by the most profound knowledge of the various mineral sublunaries, 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 Janson is the first in this country who has given an exposition of the Wernerian geognosty, composing the third volume of his "Mineralogy." The following is intended only as a brief sketch of this 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 fill 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 destitute 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 cedevant Netherlands, the northern part of Germany and Silezia, 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 Mifouri, and borders towards the east by the Apalshian 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-coasts, or river valleys, in which we have to consider the bed of the river and the holm or hough land, the high and low bank of the river. (See River-coast.) The considerably rising ground with which the lowland plains are frequently marked, is, by German geognosts, called Land-hoeken when they are nearly of equal length and breadth, and Land-rücken 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 shoals, 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 unconspicuous 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
GEOLGY.

considered with regard to their destroying, and, in consequence of this destruction, with regard to their forming effects. The waters of the ocean poison the former of these powers in a superior degree; whole maritime 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 favours 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 depozitions, &c. See Waters, Atmosphere, and Ocean.

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

From the description 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 chasms and clefts produced by floods, &c. in natural caverns and in the interior of mines. By these means we may become acquainted with four different structures, besides that of the simple fossil, which is the object of Oryctognosy; 1. The structure of rocks or mountain rocks; these are either simple (such as limestone, clay-flate, serpenite), or aggregated, in which case the principal kinds of texture of the component parts are granular, clay, porphyritic, and amygdaloidal. (See Rocks.)

2. A more general structure is that of mountain masses; these have either a simply stratified structure, &c. 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 forced structure, in which distinct concretions 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 forced 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 alleniage of several similar and dissimilar rock masses which constitute an independent whole. If the mass is uniform throughout; if, for instance, it consists entirely of sand-flone, granite, &c. it is termed simple, whereas it is a compound formation, if it exhibits dissimilar masses, such as black coal with flint-trap, &c. Some formations constitute the principal mafs of a mountain in which they occur, (granites, clay-flate, porphyry, &c.) while others occur only imbedded (porphyry, lime-flone, &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 roc-flone, in the second sand-flone, &c. For some further distinctions, see Repositories, 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 interruption, surround the whole globe, and thus constitute the greater part of its crust; to it belong almost the whole of the primitive, transition, and flint-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 Whran in Lusatia (which Werner suspects to be the result of a small and partial flood) is composed of flint-flone, lime-flone, bituminous slate and iron-chly, which all rest on loofe sand. 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 outcrops (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 class 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 crystalline, a quality denoting previous chemical solution. They comprehend granite, gneifs, micaceous-flate, slate-flate, hornblend-flate, fucicte, porphyry, serpentine, and lime-flone. These rocks are mostly disposed in conformable and unbroken stratification, each newer stratum with lower level, as is the case with gneifs, mica-flate, and clay-flate, while the granite beneath will sometimes appear to rise up through them, encompassed, 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 class; the rocks constituting this intermediate class are called transition-rocks. Lime-flone occurs more frequently in this than in the preceding class; the other rocks it contains are principally grey-wacke, grey-wacke flate, and clay-flate. (See Transition-Rocks.) To this succeeds, as of still later origin, the class of flint-rocks, in which the mechanical deposits occur in greater abundance, at the same time that the chemical precipitation disappears. (See Flutez-Rocks.) The next class which bears the character of still 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 show gradually diminishing levels from the older to the newer, there are two others, the strata...
of which, instead of having parallelism with, are superin-cum-
butent on the outgoings of the other strata: they are called
the newer flate-trap, and the newer porphyry formation, and
are seen to rest both on flate-trap 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
bafalt, 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 in which the flate-mountain
were formed. (See Fletz-Rocks and Trap-Formation.)
The second of these great formations, occurring in the
same unconformable stratification, consists of porphyry,
fyeneite, 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 PORPHYRY.

No geologist before Werner has pointed out the succes-
sion in which the different suites of formations have been
deposited from the water at different periods; a succession
which shows the alterations that the 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
subsequent periods, such as tin, molybden, 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 lim-flone formation, beginning
with the primitive crystalline granular lime-flone, and
pausing, by insensible gradations, through the transition,
and flate-lime flones, into the lowermost links of the series,
viz. chalk and calcareous tuf. 2. That of the flate form-
ation: its central point is clay-flate (from which this
formation derives its name), pausing, on one hand, through
mica-flate into gneises, when the flate structure gradually
disappears, and a paillage is formed into the oldest member,
namely granite; and, on the other hand, through transition-
flate, grey-wacke flate, and grey-wacke, into the series of
flate sand-flones, and from thence into the alluvial series,
containing a flate clay, loam, sand, and gravel. 3. The trap-
formation suite: palaces from the primitive hornblende-flate,
characterized by its crystalline nature, and from the primiti-
ve green-flone, and green-flone flate, through the transition
flate-flone, into the flate-trap, formed chiefly of amygdaloid,
and from thence into the newest flate-flate-formation, con-
stituting principally of basalt, and wacke, unconformably
superincumbent on rocks of various antiquity. 4. The por-
phyry formation suite is equally characteristic in its different
members, from old primitive porphyry, down to that mentioned
above, as of similar origin with the newest flate-flate for-
mation: the nature of the different members of this formation
stands, however, in need of further examination. (See
PORPHYRY.) 5. The syenite-formation comprehends three
principal members, the oldest of which, or the primitive gyp-
sum, occurs in mica-flate and clay-flate; the second and
third are flate-gypsum, the former of them accompanying the
following, or 6. Salt-formation, which constitutes two series,
one of which occurs only with flate-gypsum, (see Fletz-
Rocks,) while the other is still forming on the bottom of
lakes, &c. (See Rock-Salt.) 7. The coal-formation suite,
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
further investigation. (See Fletz-Rocks, and Coal.) 8. The
serpent-formation suite 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 SERPENT-
LINE.

For further particulars relating to the Wernerian style
of geology, we refer to the articles STRATA, VEIN, and
WATER. Diminution of.

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

The word is formed of the Greek γεω, terra, earth; and
μαντις, 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 cards, or sticks 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 fay, a geometrical method, a geometrical genius,
geometrical truths, geometrical construction, 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 agreement of the demonstrations,
and apply the geometry farther and farther, till we often
run nature.

Hence it is, that all machines do not succeed: that all
compositions of music, wherein the concords are the most ri-
gidly observed, are not agreeable: that the most exact astron-
omical computations do not always foretell the precise time
and quality of an eclipse, &c.

The reason is, that nature is not a mere abstract;
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 form reducible
to any fixed, known figure.

The errors, therefore, we fall into in astronomy, music,
mechanics, and the other sciences to which geometry is ap-
p lied, do not properly arise from geometry, which is an in-
fallible science, but from the fallacy of the, or the misap-
lication 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
g eo metrically true. See Construction of Equations.

GEOMETRICAL Line or Curve, c als o algebraic line or
curve, is that whereby the relations of the abscissas to the
fem-ordinates may be expressed by an algebraic equation.
See CURVE.

Geometrical lines are distinguished into classes, orders,
or genera, 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, accord-
ing 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:
hence the second, or quadratic order, will be the circle,
and the conic sections; and those of the third, or cubic order, will be the cubical and Nelian paraboloids, the cissoid 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 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 efficacy 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 some, 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 here are only to be considered; and these alone were considered by those geometers, who joined a circle with a right line. And as these are easy or hard, the construction becomes easy or hard: and therefore it is foreign to the nature of the thing, from anything 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 trochoid, 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, before 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 as far as quantities truly geometrical (that is, lines, surfaces, solids, and proportions) may be said to be some 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 so industriously 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 suppose any thing done, till by a previous problem they had shown how it was to be performed. For 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, seq.

Geometrical Office. See Curve, Evolute, and Osculum.

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

Geometrical Plane, in Architecture. See Plane.

Geometrical Plane. See Plane.

Geometrical Progression. See Geometrical Progression.

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

Thus, if A be to B, as C to D, they are in geometrical proportion: § 8, 49, 50, and 15, are geometrical proportionals. See Proportion.

Geometrical Solution of a problem, is when the problem is directly solved according to the direct principles and rules of geometry, and by lines that are truly geometrical.
In this sense we say, geometrical solution in contradistinction to a mechanical, or instrumental solution, where the problem is only solved by ruler and compasses.

The same term is likewise used 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 trisection of 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 conicoid, the cissoid, and the conic sections; and by some of their endeavours 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; viz.

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 TABLES.** See PLAIN TABLE.

**GEOMETRICALLY PROPORTIONALS.** are 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 γεωμετρεῖς, formed of γῆς or γεωργίας, earth; and μετρεῖς, to 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; inasmuch that geometry, with arithmetic, is now the general foundation of all mathematics.

Hercodotus, lib. ii. p. 102. edit. Weffelingii, Diodorus, lib. i. § 81, or vol. i, p. 91. edit. Amori. 1746. and Strabo, lib. xvii. vol. ii. p. 1159. edit. Amori. 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 bounds and landmarks of men's estates, and covering the whole face of the country, the people, say they, were obliged to dilucidate 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. Polyd. Virgili. De Invent. Rer. lib. i. cap. 18.

From Egypt geometry passed into Greece, being carried thither, as some say, by Thales; where it was much cultivated and improved by himself. Pythagoras, Anaxagoras, Chrysippus, and Plato, who testified his conviction of the necessity and importance of geometry in order to the successful study of philosophy by the following inscription on the door of his academy, _αὐτῷ τὸν μαθητῶν ἡ ἐπιστήμων, ut no one ignorant of geometry enter here._ Plato, conceiving that geometry was too much refined and restricted an appellation for this science, substitut ed for it the more extensive name of "Menfruration," 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 next to Euclid of those ancient writers, whose works are extant, is Archimedes of Susa, 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 Eratosthenes of Cyrene, who was famous about the same time with Archimedes. (See Eratosthenes.) We can only mention Eudoxus of Cnidus, Archytas of Tarantum, Philolaus, Eratosthenes, Arifarchus of Samos, Diocedes, the inventor of the quadratrix, Mencius, his brother and the disciple of Plato, the two Aristeues, Conon, Thaetides, Nicoteles, Leon, Theodorus, Heronius, 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, as Tacitus informs us, to those who pursued the chimera of divination and judicial 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 Eutocius, the Aequidens, who lived about the year of Christ 540; on Archimedes's
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Archimedes's mensuration of a circle; and the commentary on Euclid, by Proclus, who lived under the empire of Amalarius.

The conquent inundation of ignorance and barbarism was unfavourable 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 darkneas, the Arabsians 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 third century. Some of the earliest writers after this period are Leonardo Pisano, Lucas Pacioli or de Burgos, and others between 1520 and 1560. After this period appeared many editions of Euclid, or commentaries upon his Elements; e.g. Orontius Finaeus, in 1582, published a commentary on the first five books; as did James Peletarius in 1577; and about the same time Nicholas Tartaglia published a commentary on the whole 15 books. We might here mention other editions or commentaries; such are those of Commandine, Clavis, Bilingly, Schémbelius, Harlins, Dafylodius, Ramanus, Herigon, Stevins, Saville, Barrow, Tucquet, Dechales, Turnier, Scarborough, Keill, Cuff, Stone, and many others. (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 Theobaldus in his Spheres, Serenus in his sections of the cone and cylinder, Kepler in his Nova Stereometria, &c.; in 1635, Bonaventure Cavalierus, an Italian of the order of Jefuits, published his "Geometry of Indivisibles:" Torricelli his "Opera Geometrica:" Viviani, his "Divinaciones Geometricas," "Exercitatio Mathematica," "De Locis Solidi," "De Maximi et Minimi," &c.; Vieta, his "Effetto Geometrica," &c.; Gregory St. Vincent, in 1647, published his treatise, entitled "Quadratura Circuli & Hyperbolae," a work abounding with excellent problems and paradoxes; and Pascal, about the same time, published his treatise of the cycloid. Geometry, as far as it was capable of deriving aid and improvement from the arithmetic of infinities, was indebted to the labours of Fermat, Barrow, Wallis, Mercator, Boucker, J. Gregory, Huygens, and others, to whom we may add Newton and Leibnitz. (See Fluxions.) 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 Encyclopaedia, 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 subscribe to the words of Pope, that the sagacity of Newton astounded 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, "bonum homini quid praestat, quando differt, quod unum in multitude sit, et unum in multitudine alterum!"

The modern geometers are innumerable; and the names of Cote, Maclaurin, R. Simfon, T. Stewart, T. Simfon, &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, &c. 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 may be all referred to lines. Consequences may be drawn from them; and these consequences, again, being rendered sensible 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 purifying them farther.

The reason, for instance, why we know so dif tinely, and mark so precisely, the concords called octave, fifth, fourth, &c. is that we have learnt to express sounds by lines, &c. by chords accurately divided; and that we know, that the chord, which sounds octave, is double of that with which it makes octave; that the fifth is the sesquialterate ratio, or as three to two; and of the rest. 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 finest bent-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 insensible to them; and much more the chroma, 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 to 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 incontestable demonstrations; though we allow, that the tunes 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 incomensurable magnitudes.

It must be observed, that this use of geometry among the ancients was not strictly scientific, 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 used as means or instruments of discovering, but as images or characters, to preserve, or communicate, the discoveries that were already made.
"The Egyptians," Gale observes, "used geometrical figures, not only to express the generations, mutations, and deflations 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, 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. Ægyptiac. 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 into the modern geometry new lines of infinitely more, 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 former 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 sublimer.

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

Geometry, higher, or sublimer, 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.

Those of the higher geometry are Archimedes, in his books De Sphaera, Cylindro, and Circul Delineamento; as also De Spirallibus, Conoidibus, Spheroideibus, De Quadratura Parabolae, and Arenaria: Kepler, in his Stereometria Nova; Cavalierius, in his Geometria Individivilibium; and Torricellius, De Solidis Spheraulis; Pappus Alexander, in Collectibis Mathematicis; Paulus Galilaeus, in his Mechanis and Statibus; Barrow, in his Lectiones Geometricae; Haygus, De Circuli Magnitudine; Ballalidas, De Lineis Spirallibus; Schooten, in his Exercitationis Mathematicae; De Billy, De Propriitate Harmoniae; Lalva, De Cycloide, For. Erneft. Com. ab Harfenheim, in Diastome Cirellorum; Viviani, in Exercit. Mathematic., De Formacione & Menatura Punctum; Bap. Palma, in Geomet. Excercitation, and Apoll. Pergamin, De Sectione Rationem. 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 Clavius's, Tacquet's, and Ozanam's Practical Geometries; De la Hire's Ecole des Arpenteurs; Reinhold's Geodez; Hartman Beyers's Stereometria; Voigtel's Geometria Subterranea; all in High Dutch: Hufhus, Galileus, Goldmannus, Scheffelt, and Ozanam, on the Sector. &c. &c. &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, oblique, 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, parallelepipedon, 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 method 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 compendious form, which may be easily procured. The Elements of Euclid by Dr. R. Simpon 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, Bonnycaill, Leibfe, &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 devise a considerable space to this part of the science; the following treatise is chiefly compiled from the "Feuilles d'Analyse" 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 (Analyzis, Plate VIII, fig. 1.) is defined by referring its position to two lines, as AY, AX, generally at right angles to each other, but they may be inclined at any given angle.

If M Q be drawn perpendicular to AY, and M P perpendicular to AX, then QM, MP, 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 AY, AX 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 A X,
Y A X, then \( x = \pm a, y = \pm b \). The equation of \( M' \) is \( x = -a, y = \pm b \). The equation of \( M' \) is \( x = -a, y = -b \). If the point M is situated on the line A X, then \( y = c, x = a \).

If it is situated on A Y, then \( x = c, y = b \), and at the point A, \( x = 0, y = c \).

The point M may likewise be defined by the length of the line A M, and by the angle \( \varphi \), which makes with the axis A X. If this length be expressed by \( s \), and the angle by \( \varphi \), \( s = \varphi ; \varphi = A \).

\( \alpha \) being the number of degrees contained in the angle \( \varphi \), and \( \varphi \) the value of \( \alpha \).

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.

We shall first consider this 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 \( A P = x' \), its ordinate \( M' = y' \); these co-ordinates, like those of the other points, make an angle \( \varphi \) with each other, which is that of the axes, we shall have this equation:

\[
\frac{y'}{x'} = \tan \alpha \]

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

\[
\frac{y''}{x''} = \frac{\tan \alpha}{\tan (\varphi - \alpha)} \]

If \( x, y \) represent the co-ordinates of any point in A L, the general equation will be

\[
y = \frac{\tan \alpha}{\tan (\varphi - \alpha)} x \] ........................ (1)

Thus \( x \) becomes successively \( x', x'', \&c. \) 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:

\[
y = \frac{\tan \alpha}{\tan (\varphi - \alpha)} x \] ........................ (2)

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 \( y \) corresponding 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 \( \varphi \), the equation (2) retains the same form.

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

\[
y = \frac{\tan \alpha}{\tan (\varphi - \alpha)} x + b \] ........................ (3)

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

Let us suppose the quantities \( a \), \( \varphi \) and \( b \) given, and that it is required to construct the straight line \( y = \frac{\tan \alpha}{\tan (\varphi - \alpha)} x + b \); the problem is reduced to finding two of these points; we endeavour to find the points in which the line cuts the two axes A X, A Y (fig. 3) the intersection R being the only point of the line in which \( y = c, \) and \( R' \) the only point of the same line in which \( y = c \); we suppose, successively, \( x = c, y = c \), and we shall find \( y = \frac{\tan \alpha}{\tan (\varphi - \alpha)} b = A R' \); 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° with each other, and the inclination \( \alpha \), which the line makes with the axis X be required; since \( \frac{\tan \alpha}{\tan 45° - \alpha} = 1 \), \( \tan \alpha = \frac{1}{\sqrt{2}} \),

\[
\frac{1}{\sqrt{2}} \tan \alpha \] ........................ (4)

The value of \( b \) remaining constant, the line takes every possible position round the point R (fig. 2.) for every possible angle from \( \alpha \) to 360°; 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 Y'. There exists, therefore, no line in the same plane which cannot be defined by equation (3), provided \( b \) and \( a \) 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, \( \tan \beta = \tan 90° = 1 \), and \( \frac{\sin (\varphi - \alpha)}{\cos \varphi} = \cos \alpha \); and equation (3) becomes \( y = x \tan \alpha + b \), \( a + b \) being the angle of slope.

When the straight line passes through the origin of the co-ordinates, its equation becomes \( y = ax \).

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

We may now construct the equation \( y = x + 1, y = -x - 1 \).

The two lines cut the axis A X 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 \( y = x \sqrt{x - 1} \) is reduced to a point on the axis Y below the origin, and distant from it by a quantity equal to unity, 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 \(x\) becomes \(x'\); and when \(x = x'\), \(y = y'\), we have therefore two equations of condition:

(2) \(y' = ax' + b, \ y'' = ax'' + b \) ........ (3)

from whence we obtain

\[
a = \frac{y'' - y'}{x'' - x'} = \frac{y'' - y'}{x'' - x'};
\]

and by substituting for \(a\) its value, we have

\[
b = \frac{y'' - y'}{x'' - x'} x' = \frac{y'' - y'}{x'' - x'} x'.
\]

Or equation (2) may be subtracted from equation (1), then

\[y - y' = a (x - x') \] which determines the line parallel to the axis \(A X\).

If \(y' = y\), then \(y = y\), or \(y = y\), which denotes that the line becomes a straight line parallel to the axis.

If \(x' = x''\), \(y = \frac{y'' - y'}{x'' - x'} = \infty\), the angle which the line makes with the axis is in this case a right angle.

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 expressions, and the preceding expression is reduced to

\[D = \sqrt{y'' - y' + x'' - x'}.\]

Then the equation to the straight line is \(y' = x' y'; a'\); and as this also takes place when \(x = x', y = y'\), it gives \(y' = ax + b\).

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 \(y = ax + b + \) ........ (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 \(y' = ax' + b\) ........ (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

\[y - y' = a (x - x') \] ....... (5).

If the given point be taken on the given line, then \(y'\) is the value of \(y\), which corresponds to \(x = x'\); and equation (1) becomes

\[y' = a x' + b.\]

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 \(C A X, C B X\), are given, the angle to be found is \(A C B\). Put \(C A X = \alpha, C B X = \alpha'; C A B = V,\) tang. \(\alpha = \alpha, \ tan. \alpha = \alpha';\) then \(\alpha' = \alpha + V,\) and tang. \(V = \tan. (\alpha' - \alpha) = \frac{a' - a}{1 + a a'}\). If the straight lines are parallel, tang. \(V = \infty, \) and \(a' = a;\) if they are perpendicular, tang. \(V = \infty, \) or \(\frac{1}{\tan. V} = \infty;\) therefore \(1 + a a' = 0.\)

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

\[y = ax + b \] (1) and that required \(y = ax' + b' \) ........ (2) \(a\) and \(b\) are given; from 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 when \(x = x', y = y';\) hence

\[y' = a' x' + b' \] (3), and consequently

\[y - y' = a (x - x') \] (4).

Let \(b'\) be 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,

\[y - y' = \frac{a + m}{1 - m a} (x - x') \] (5).

PROBLEM VI.

To determine the condition under which three lines, drawn from the angles of a triangle, will meet in a single point. Let \(x', y', x'', y''\); \(x', y'\); \(x'', y''\) 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 the lines make with the axis \(A X.\) For these lines to meet in a point, it is requisite that the same value of \(x, y\) should satisfy for the three equations, which is equivalent to finding the value of \(x, y\) 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
\[ a'(y'' - y') + a''(y'' - y') + a'''(y - y') + a' a''(x'' - x') + a' a''(y'' - x') + a'' a''(x'' - x') = 0 \]

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) subsists.

The equation to BC is \[ y - y'' = \frac{y'' - y'}{x'' - x'} (x - x') \]
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 \[ a'' + 1 = 0, \]
ought to exist between the trigonometrical tangents; but here \[ a = \frac{y'' - y'}{x'' - x'}, \]
therefore \[ a' = \frac{y'' - y'}{x'' - x'}. \]
The straight line drawn through B being perpendicular to DC, we conclude
\[ y - y'' = \frac{y'' - y'}{x'' - x'} (x - x') \]
and the straight line drawn through C being perpendicular to DB, we have likewise
\[ y - y'' = \frac{y'' - y'}{x'' - x'} (x - x') \]
Hence the values of \( a' \), \( a'' \), are
\[ a'' = \frac{x'' - x'}{y'' - y'} \quad a'' = \frac{x'' - x'}{y'' - y'} \]
and likewise
\[ a' a''(x'' - x') = \frac{(x'' - x')(x'' - x')(y'' - y')}{(y'' - y')(y'' - y')} \]
\[ a'' (x'' - x') = \frac{N}{D} = \frac{(y'' - y')(y'' - y')}{(y'' - y')(y'' - y')} \ 
(2) \]
We deduce \( a'' = \frac{2 y'}{x'' - x'} \); and as this is found to be the value of \( a'' \) that is, of the trigonometrical tangent of the angle which the line DM makes with AX, it may be concluded that this third line passes 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, to the equation of A D is \[ y = \frac{y'}{x} \]
of D C, \[ y = \frac{y'}{x} \]
of A C, \[ y = 0 \]
The equations of the perpendiculars to these sides are, \[ y - \frac{y'}{x} = \frac{y'}{x} (x - \frac{y'}{x}) \]
\[ y - \frac{y'}{x} = \frac{y'}{x} (x - \frac{y'}{x}) \]
\[ x = \frac{x''}{2} \]
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 exists a point of intersection; now \( x \) is found to be \( \frac{x''}{2} \); therefore these three lines intersect in a point.

**Method of determining the Position of a Point in Space.**

Let AX, AY, AZ, be three straight lines reciprocally perpendicular to each other (fig. 10a) 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 ZAX and ZAY vertical, and the plane YAX horizontal. Let a point in space be represented by \( M \), situated out of the planes ZAX, ZAY, YAX in real position, for example, before the first plane, to the right of the second, and above the third; and let us suppose perpendiculars \( M'M' \), \( MM' \), \( MM' \) from the point \( M \) to these three planes; these perpendiculars will measure the shortest distances from the point to each of these planes. The planes drawn through the perpendiculars \( MM' \) and \( MM' \), \( MM' \) and \( MM' \), \( MM' \) and \( MM' \) will enclose the parallelepiped, and the point \( M \) will be the summit of the solid trihedral angle \( A \) opposite to the angle \( A \).

The distance \( MM' \) from the point \( M \), to the plane ZAX is in real length equal to \( MM'' \); the distance \( MM' \) from the same point to the plane ZAY is \( MM'' \) or \( Mm \),
and the distance from this point to the horizontal plane \( \mathbf{XY} = \mathbf{M}' \) or \( \mathbf{M}' \) or \( \mathbf{M}' \). Thus these distances may be found on the fixed lines \( \mathbf{AY}, \mathbf{AX}, \mathbf{AZ} \).

The points \( \mathbf{M}', \mathbf{M}', \mathbf{M}' \), of the perpendiculars let fall from the point \( \mathbf{M} \) on the planes to which we refer the position of this point, are called the **vertical** and **horizontal projections** of the point \( \mathbf{M} \), **vertical** in considering \( \mathbf{M}' \) and \( \mathbf{M}' \), and **horizontal** when considering \( \mathbf{M}' \).

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 \( \mathbf{M} \).

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 \( \mathbf{YA}Z \) by \( x \), its distance from the plane \( \mathbf{YA}X \) by \( y \), and its distance from the plane \( \mathbf{YA}X \) 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 \( x = a, z = c \), denote the position of the projection \( \mathbf{M}' \); the formula \( y = b, z = c \), denote the projection \( \mathbf{M}' \); and these two projections are sufficient, as we have seen, to find the position of the point; and these two systems of formula comprise the data of the three distances. When the point is in the horizontal plane, \( x = 0 \), and its position is fixed by \( x = a, y = b, z = c \); when it is in the plane \( \mathbf{YA}X \), \( y = 0 \), and its position is determined by \( x = a, z = c \); and if in the plane \( \mathbf{YA}X \) we have \( x = 0 \), \( y = 0 \), \( z = c \).

For a point situated on the axis \( \mathbf{AX} \), we have \( z = 0 \), \( y = 0 \); the point on the axis \( \mathbf{AY} \), \( z = 0 \), \( y = 0 \); and if on \( \mathbf{AZ} \), \( x = 0 \), \( y = 0 \).

At \( A \), the origin of these distances, we have \( x = 0 \), \( y = 0 \), \( z = 0 \).

Every point in the plane, \( \mathbf{M}' \) and \( \mathbf{M}' \), and consequently the plane itself, is denoted by \( x = a \), because \( a \) is the common distance of each of its points from the plane \( \mathbf{YA}Z \).

The plane \( \mathbf{M}' \) is denoted by \( y = b \), and the plane \( \mathbf{M}' \) is denoted by \( z = c \).

The position of these three planes gives that of the point \( \mathbf{M} \), and consequently this point 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 \( xz \), and \( yz \); these projections will be the other straight lines, which have for their equations

\[ x = a, y = b + z \]

eliminating \( z \) from these equations, the resulting equation is \( b x - a y = b a - a \rho \), which belongs to the plane \( \mathbf{xy} \).

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 \( a, b, \rho \).

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 \( x = a, y = b, z = c \), for the point where the straight line intersects the plane \( xz \); \( z = - \frac{b}{a} x + a \) for the point where it

intersects \( xz \); \( z = - \frac{a}{b} y + b \) for the point where it intersects the plane \( zy \); \( y = \frac{x}{a} b + 0 \) for the point where it

meets the plane \( yz \).

The straight line, whose equation is \( x = az + a \), makes, with the axis \( x \), an angle, whose tangent is \( a \); it cuts the axis \( x \) in a point, whose distance from the origin of the co-ordinates is equal \( a \), since, if in this equation \( z = 0 \), \( a = a \).

If two straight lines are situated in the same plane; suppose that of \( x, z \), then let the equation to the first be \( x = az + a \), and to the second \( x = az + a + \beta \); for these straight lines to be parallel, \( a' \) must be \( a \), and, if perpendicular, \( a' + a' \) is \( a \), or \( a' = - \frac{1}{a} \).

The equation of two straight lines, situated in space being, for the first,

\[ x = a + a y = b + \beta \]

the equation, which expresses that these lines meet each other, is \( (a' - a) (b - b) - (a' - b) (a' - a) = 0 \), 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 \( x, y, z \); be the co-ordinates of the first point; \( x', y', z' \), of the second, the straight line passing through the first point, its equations will be of the form

\[ x - x' = a (z - z') \]

\[ y - y' = b (z - z') \]

of which 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; \( x'', y'', z'' \), of the second, the straight line passing through the first point, its equations must also be

\[ x - x'' = a (y - y'') \]

\[ y - y' = b (z - z'') \]

\[ z - z'' = c (y - y'') \]

\[ a, b, c \] being eliminated from their four equations, the equations of the required straight line will be

\[ x (z' - z'') = y (x' - x'') + x'' z' - x' z'' \]

\[ y (z' - z'') = z (x' - x'') + y'' z' - y' z'' \]

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

\[ \sqrt{(x' - x'')^2 + (y' - y'')^2 + (z' - z'')^2} \]
Of the Equation to a Plane.—A plane being given by its inter-
teraction with two co-ordinate planes, it may be conceived
as generated by one of these planes moving parallel to itself in
the direction of the other.

Let \( z = \alpha x + \gamma y + \beta \) and \( z = \beta y + \gamma \), be the equations to
the two given intersecting lines, the generating plane being
parallel to itself, and to the intersecting line on the plane
\( x, y \), its equations in any one position will be
\[ z = \alpha x + \gamma y, \gamma = \beta. \]
But if it should meet the second line, whose equations are
\[ x = 0, \]
\[ z = \beta y + \gamma; \]
hence this equation of condition
\[ \beta + \gamma = \gamma; \]
from which it follows, that the equation of the generating
plane, in any given position, depending on \( \beta \), are
\[ z = \alpha x + b \beta + \gamma \]
\[ z = \beta y + \gamma. \]
Eliminating \( \beta \) from these two equations, that of the plane
is obtained,
\[ z = \alpha x + b \gamma + \gamma, \]
in which \( \alpha \) and \( b \) are the tangents of the angles which
the intersections of the planes make with the axes \( x \) and \( y \); \( \gamma \) is the
co-ordinate \( z \), corresponding to the origin of the ordinates;
therefore, if in the equation of the plane, \( x \) and \( y \) are made \( = 0 \),
\( z = \gamma \). This equation may be more commodiously expressed
by the following form:
\[
A x + B y + C z + D = 0,
\]
in which, of the four constant quantities, \( A, B, C, D \), three
\[
\begin{align*}
A & = a \\
B & = b \\
C & = c.
\end{align*}
\]
only are necessary; hence
\[
\begin{align*}
x & = 0 \\
y & = 0 \\
z & = b y + \gamma.
\end{align*}
\]

The equation of a plane has been determined from its inter-
terctions with the planes of the co-ordinates. Thee inter-
terCTIONS may likewise be determined by the equation to the plane.

Let \( a x + b y + c = \gamma \), make successively \( x = 0, y = 0, z = 0 \),
and there result
\[
\begin{align*}
\begin{cases}
a x + b y + c & = 0 \quad (x = 0) \\
y = 0 \\
z = b y + \gamma,
\end{cases}
\end{align*}
\]
which equations belong to the interections
of the given plane with the three planes \( x, y, z \), and \( x, y \).

The equation of a straight line, situated in one of the co-
ordinate planes, is likewise that of a plane passing through
this line, and perpendicular to the plane of the co-ordinates
which contains it. When the plane is perpendicular to one of
the axes, as \( x \), its equation is \( x = \gamma \) (constant); \( y = \beta \),
\( z = \gamma \), are the equations of two other planes, one perpendi-
cular to the axis \( y \), and the other perpendicular to the axis \( z \).

In the equation to the plane make successively
\[
\begin{align*}
x & = c \\
y & = c \\
z & = c
\end{align*}
\]
\[
\begin{align*}
\begin{cases}
x = c \quad (x = c) \\
y = c \\
z = c \quad (x = c)
\end{cases}
\end{align*}
\]
values will then be obtained for \( x, y, z \), which are the distances of the origin of the co-
ordinates from the points of intersection of the plane with
the axes of the co-ordinates; let the equation to the planes be
\( z = a x + b y + c \); these distances will be \( -\frac{c}{a}, -\frac{c}{b}, c \).

Two planes which are parallel have parallel interections;
therefore, if the equation to the first plane be
\[ z = a x + b y + c, \]
the second, \( z = a' x + b' y + c' \)
the condition of parallelism will be expressed by the equa-
tions \( a = a', b = b' \).

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
\[ z = ax + by + d \]
and that of the plane required
\[ z = a' x + b' y + d \]
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 \( 1, \ldots, x', y', z' \),
\[ 2, \ldots, x'', y'', z'' \]
\[ 3, \ldots, x''', y''', z'''. \]
The equation of the plane required being supposed
\[ A x + B y + C z + D = 0 \]
the three following conditions are obtained ;
\[ A x'' + B y' + C z = 0 \]
\[ A x'' + B y'' + C z'' + D = 0 \]
\[ A x'' + B y'' + C z''' + D = 0. \]
from which are deduced the following equations:
\[ A = y'' (z'' - z') + y'' (z'' - z') + y'' (z'' - z'), \]
\[ B = x' (x'' - x') + x' (x'' - x') + x' (x'' - x') \]
\[ C = x' (y'' - y') + x' (y'' - y') + x' (y'' - y'), \]
\[ D = x' (x'' - x') + x' (y'' - y') + x' (y'' - y'). \]
The three co-efficients to determine are \( A, B, C, D \) from
the same number of equations. If the triangle formed by
the straight lines joining the given points he projected on the
three planes \( x, y, z \), the areas of these respective pro-
jections will be \( 2, 2, 2 \), and it will be shown that \( D \) is six
times the solidity 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 of \( x z \), the area of the
trapezium \( x'' y'' x'' z'' \) will be
\[ \frac{1}{2} \]
the area of the trapezium \( x' z'' y'' x'' \) will be
\[ \frac{1}{2} \]
and that of the trapezium \( x' z' y'' x'' \) will be
\[ \frac{1}{2} \]
From the sum of the two first surfaces, take the last, the
difference will be the area of the triangle projected on the
plane \( x z \), which will be \( -\frac{1}{2} \). 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 equations 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 to the point;
\[ x = a x + \gamma \\
\]
\[ y = b y + \gamma \\
\]
\[ b = (x - a) = a (y - \gamma). \]

Then

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Then since the plane, whole equation is required, passes through the given point, and likewise through the point where the given line intersects the plane \( x'y' \), the co-ordinates to which points are \( z = 0 \), \( x = \alpha, y = \beta \). If the equation to the plane be supposed

\[ z = Ax + By + D, \]

in which \( A, B, D \), are co-efficient to be determined, then

\[ z' = A'x' + B'y' + D \quad \ldots \ldots \quad (1) \]

\[ z = A + Bz + D \quad \ldots \ldots \quad (2) \]

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,

\[ x = ax + y = b z, ay = bx \]

and for the plane \( x = Ax + By + B \).

In this position the line is still in the plane, so that their co-ordinates are still the same; therefore,

\[ z = A'z + Bz, \quad z = A + Bz \]

The equations, \( 1, 2, 3 \), will give \( A, B, D \) in terms of \( a, b, \alpha, \beta \); and the equation of the plane will be

\[ (x - x')(y' - b z' - \beta) - (y' - x') (x' - a z - \alpha) \]

\[ + (z - z') \cdot (b x' - a) (y' - \beta) \cdot = 0 \cdot \]

**Problem 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; 2nd, the co-ordinates of the points where they meet; 3rd, 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-ordinate planes and the projection of the line with these main planes are perpendicular to each other.

Let \( x = ax + ay = b z + \beta \) be the equations to the line; \( z = Az + By + C \) the equation to the plane; the equations to the intersections of the plane with the rectangular planes of \( axz \) and \( xy \), are \( z = Ax + C \), \( z = By + C \), but the plane being perpendicular to the line \( \alpha = a, B = b \); therefore the equation of a plane parallel to the line, is \( ax + by + z = C \); combining this equation with those of the straight line \( x = ax + ay = b z + \beta \) we may deduce the values of \( x, y, z \), the co-ordinates of the point of intersection, and the plane may be expressed in this form

\[ a (x - x') + b (y' - y') + z' = C - ax - by' - z' \]

Let \( X', Y', Z' \), be the co-ordinates of the point of intersection of the plane and perpendicular, then

\[ Z = z' + C - ax' - by' - z' \]

\[ Y' + b (C - ax - by' - z') \]

\[ X' = a (C - ax' - by' - z') \]

The length of the perpendicular comprehended between the points \( X, Y, Z \) and the points \( x', y', z' \), is

\[ \sqrt{(x - x')^2 + (y' - y')^2 + (z' - z)^2} \]

\[ \sqrt{C - ax' - by' - z'} \]

Hence it follows that the perpendicular drawn from the origin of the co-ordinates upon a plane whose equation is

\[ ax + by + z = C \]

\[ \sqrt{1 + a^2 + b^2} \]

Having the equations of a straight line \( \{x = a + \alpha, y = b + \beta \} \)

the equation of a plane perpendicular to this line drawn through the point \( x', y', z' \), is

\[ a (x - x') + b (y' - y') + z' = 0 \]

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;

\[ x - x' = ax + a - x' \]

\[ y - y' = bx + bx - y' \]

Let \( X', Y', Z' \), be the co-ordinates of the points of intersection; then

\[ Z = a (x' - x) + b (y' - y) + z' \]

\[ Y = b (x' - x) + b (y' - y) + z' \]

Then

\[ X = a (x' - x) + b (y' - y) + z' \]

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 \( x = ax \), \( y = by \), and the radical

\[ \sqrt{X'^2 + Y'^2 + Z'^2} \]

expresses the length of the straight line, drawn from the origin of the co-ordinates to its intersection with the perpendicular let fall from the point \( x', y', z' \), upon it; on this supposition, \( x = ax + ay = b z + \beta \)

\[ Z' = a x' + b y' + z \]

\[ y' = b x' \]

\[ Y' = b z' \]

\[ X' = acz \]

therefore

\[ \sqrt{X'^2 + Y'^2 + Z'^2} = \sqrt{a^2 + b^2 + c^2} \]

This expression is used in finding the angle which two straight lines make with each other.

4th. 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

\[ \{x = ax + a, y = by + b \} \]

\[ \{x = ax + a, y = by + b \} \]

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

\[ \{x = ax + a, y = by + b \} \]

\[ \{x = ax + a, y = by + b \} \]

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

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\[ \sqrt{x^2 + y^2 + z^2} \]
the other, as found in the preceding

Therefore the cofine of the required angle is equal

\[ \frac{a \cdot x' + b \cdot y' + c \cdot z'}{\sqrt{1 + a^2 + b^2}} \]

But \( a' = a \cdot z', \quad y' = b \cdot z' \); therefore the cofine of the

angle formed by the two given straight lines

\[ \frac{1 + a \cdot a' + b \cdot b'}{\sqrt{1 + a^2 + b^2} \times \sqrt{1 + a'^2 + b'^2}} \]

It appears from this expression, that when two straight lines have for their equations

\[
\begin{align*}
1 & \quad x = a \cdot z, \quad y = b \cdot z \\
2 & \quad x = a' \cdot z, \quad y = b' \cdot z
\end{align*}
\]

if they are perpendicular to each other, the following equation of condition will be obtained, \( 1 + a \cdot a' + b \cdot b' = 0 \), 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 \( a \cdot x + b \cdot y + c \cdot z = 0 \). But the perpendicular to the first straight line must be contained in the plane perpendicular to it; therefore the equations to the perpendicular \( x = a' \cdot z, \quad y = b' \cdot z \), and the equation of the plane must be obtained at the same time; therefore \( 1 + a \cdot a' + b \cdot b' = 0 \). The angle of the two planes may be thus determined. Let \( a \cdot x + b \cdot y + c = C, \quad a' \cdot x + b' \cdot y + c = C' \) be the equations of the planes; then 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 cofine of the angle formed by the two given planes, is

\[ \frac{1 + a \cdot a' + b \cdot b'}{\sqrt{1 + a^2 + b^2} \times \sqrt{1 + a'^2 + b'^2}} \]

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 coordinates, 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 cofine of the angle of the two lines is the sine of the angle required.

The straight line, whose equations are \( x = a \cdot z, \quad y = b \cdot z \), makes with the axes \( x, \quad y, \quad z \), the angles whose cofines are

\[
\begin{align*}
\sqrt{x^2 + y^2 + z^2} & \quad \sqrt{x^2 + y^2 + z^2} \\
\sqrt{1 + a^2 + b^2} & \quad \sqrt{1 + a'^2 + b'^2} \\
\sqrt{1 + a'^2 + b'^2} & \quad \sqrt{1 + a^2 + b^2}
\end{align*}
\]

The same expressions are the values of the cofines of the angles which a plane perpendicular to the straight line, and whose equation is \( a \cdot x + b \cdot y + c = 0 \), makes with the co-ordinate planes \( x, y, z \). If the equation of the plane is \( A \cdot x + B \cdot y + C \cdot z + D = 0 \), the cofines of the angles which it makes with the co-ordinate planes are

\[
\begin{align*}
\frac{A}{\sqrt{A^2 + B^2 + C^2}} & \quad \frac{B}{\sqrt{A^2 + B^2 + C^2}} \\
\frac{C}{\sqrt{A^2 + B^2 + C^2}} & \quad \frac{D}{\sqrt{A^2 + B^2 + C}}
\end{align*}
\]

and the expression found above for the perpendicular, let fall from the origin of the co-ordinates on the plane, becomes

\[ \frac{D}{\sqrt{A^2 + B^2 + C}} \]

It has been already remarked, that if \( T \) be the triangle formed by the three lines which join, two and two, the three given points, and \( t, \ t', \ t'' \) its projections on the co-ordinate planes, then \( t = \frac{1}{2} \cdot A, \ t' = \frac{1}{2} \cdot B, \ t'' = \frac{1}{2} \cdot C \); therefore 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 \( \frac{D}{3} \); and substituting for \( A, \ B, \ C \) their values \( t, \ t', \ t'' \), \( T = \frac{1}{6} \cdot t + t' + t'' \).

If \( S \) be the area of another triangle whose projections are \( t, \ t', \ t'' \), and situated in the same plane as the triangle \( T \); then \( S = \frac{1}{3} \cdot t + t' + t'' \).

Since \( T = \frac{1}{2} \cdot \sqrt{A^2 + B^2 + C^2} \) \( T = \frac{1}{2} \cdot \frac{1}{\sqrt{A^2 + B^2 + C^2}} \)

in like manner \( T = \frac{1}{2} \cdot \frac{1}{\sqrt{A^2 + B^2 + C^2}} \)

which signifies that any triangle is to its projection on one of the co-ordinate planes as radius to the cofine 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, \( T = \frac{1}{2} \cdot t + t' + t'' \) it will become

\[ T = \frac{1}{2} \cdot t' + t'' \]

\[ T = \frac{1}{2} \cdot t + t' + t'' \]

Taking in the same manner in the same plane a third triangle \( R \), whose projections on the rectangular planes are \( r, \ r', \ r'' \), it may be shown that \( \frac{1}{2} \cdot (R + S + T') = (r + r' + r'') \)

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.

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; 2d, 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 evidently the line required, therefore the equations to these planes will be those of the line required.

Let \( x = a \cdot z + a, \quad y = b \cdot z + b \), be the equations to the first line, it will meet the plane \( xy \) in a point \( P \), of which the co-ordinates \( z = c, \quad y = b, \quad x = a \).

The second straight line having for its equations \( x = a'z + a', \quad y = b'z + b' \), it meets the plane \( xy \) in a point \( P' \), whose co-ordinates are \( z = c, \quad y = b', \quad x = a' \).

The equations of the planes drawn through the points \( P \) and \( P' \) parallel to the two given straight lines are of the form

\[ A (x - a) \]
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\[ A (x - a) + B (y - \beta) + z = 0 \ldots \ldots (c) \]
\[ A (x - a') + B (y - \beta') + z = 0 \ldots \ldots (c') \]

A and B being two constant quantities determinable by the following equations

\[ 1 + A a + B b = 0 \]
\[ 1 + A a' + B b' = 0 \]
\[ A = \frac{b - b'}{a - a'} \quad (1) \]
\[ \frac{a' - a}{b' - b} \]

The perpendiculars to these parallel planes drawn through the points \( P, P' \) have their equations

\[ x = A \alpha + \alpha' ; \quad y = B \alpha + \beta \]
\[ 2d \quad x = A \alpha + \alpha' ; \quad y = B \beta + \beta' \]

The plane drawn through the first of these perpendiculars, and the first given line, has for its equation

\[ L (x - a) + M (y - \beta) + z = 0 \quad (E) \]

\[ L' (x - a') + M' (y - \beta') + z = 0 \quad (E') \]

L and M being given by the two equations

\[ 1 + L A + M b = 0 \quad (3) \]
\[ 1 + L a + M b = 0 \quad (4) \]

The equation of the plane drawn through the second perpendicular, and the second given line is

\[ L' (x - a') + M' (y - \beta') + z = 0 \quad (E') \]

L' and M' being determinable by the equations

\[ 1 + L' A + M' b = 0 \]
\[ 1 + L' a' + M' b = 0 \]

Now each of these last planes contains the required line, therefore the equations of their line of intersection will be those required.

The equations \( (1) \quad (2) \) give the values of A and B, and combining them with equations \( (3) \quad (4) \) the following values are obtained for L, M, L', M':

\[ L = a - a' + b (a b' - a' b) \]
\[ a (a' - a) + b' (b' - b) \]
\[ L' = a - a' + b (a b' - a' b) \]
\[ a (a' - a) + b' (b' - b) \]
\[ M = a (a' - a) + b (b' - b) \]
\[ a (a' - a) + b' (b' - b) \]
\[ M' = a (a' - a) + b (b' - b) \]

Substituting these values in equations \( (E) \quad (E') \) we have

\[ (x - a) \left\{ a - a' + b (a b' - a' b) \right\} + (y - \beta) \left\{ b - b' - a (a' - a) + b (b' - b) \right\} \]
\[ = 0 \quad (x - a') \left\{ a - a' + b (a b' - a' b) \right\} + (y - \beta) \left\{ b - b' - a (a' - a) + b (b' - b) \right\} \]
\[ = 0 \quad \left\{ b - b' - a (a' - a) + b (b' - b) \right\} + \left\{ a (a' - a) + b (b' - b) \right\} \]
\[ = 0 \quad \left\{ b - b' - a (a' - a) + b (b' - b) \right\} + \left\{ a (a' - a) + b (b' - b) \right\} \]

From these two equations which represent the required line, its projections on the planes \( y, z, x \), may be found by successively eliminating \( x \) and \( y \).

It remains now to determine the absolute length of the shortest distance between the two lines.

If from the origin of the co-ordinates a perpendicular be let fall on each of the parallel planes, these, having the same direction, will become one and the same straight line; their difference, or the distance between the two planes, will be the shortest distance required. The length of these perpendiculars will, by the last problem, be

\[ P = \frac{A a + B b}{\sqrt{1 + A^2 + B^2}} \]

for the plane

A \[(a - a') + B (y - \beta) + z = 0 \]; D being = A x + B \beta; \]

and \[ P' = \frac{A a' + B b'}{\sqrt{1 + A^2 + B^2}} \]

for the plane

A \[(a - a') + B (y - \beta) + z = 0 \]

where \( D' = A x + B \beta \).

The difference \( P = \frac{A (\beta - \beta') + B (\beta' - \beta)}{\sqrt{1 + A^2 + B^2}} \)

Substituting for \( A, B \) their values

\[ P' - P = \frac{(a' - a) (b' - b) - (\beta' - \beta) (a' - a)}{\sqrt{1 + A^2 + B^2}} \]

When the straight lines meet each other, this distance being nothing, \( (a' - a) (b' - b) - (\beta' - \beta) (a' - a) = 0 \)

the same equation, as has been already found, expressing the right lines which intersect each other.

On the transformation of the co-ordinates—Given the co-
ordinates of a point in relation to three rectangular planes, to determine the co-ordinates of this point, in respect to three other planes.

The three new planes being given in position in respect to three primitive planes, their equations are given.

Let these be, for the

1st, \[ A x + B y + C z = D = 0 \]
2nd, \[ A' x + B' y + C' z + D' = 0 \]
3rd, \[ A'' x + B'' y + C'' z + D'' = 0 \]

These three planes intersect 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 new 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 \( x, y, z \) be the co-ordinates of the point in relation to the primitive planes, and \( x, y, z \) its co-ordinates in relation to the three new planes. For conciseness let

\[ (A \quad C \quad B') + B (A' C' - A'' C)+ C (B' A' - B'' A') \]
\[ (C B' - C' B) + B (A' C' - A'' C)+ C (B' A' - B'' A') \]
\[ (C B' - C' B) + B (A' C' - A'' C)+ C (B' A' - B'' A') \]
\[ (C B' - C' B) + B (A' C' - A'' C)+ C (B' A' - B'' A') \]

The values of the new co-ordinates will be

\[ x = \frac{A x + B y + C z + D}{L} \]
\[ y = \frac{A' x + B' y + C' z + D'}{L'} \]
\[ z = \frac{A'' x + B'' y + C'' z + D''}{L''} \]

If the three new planes be supposed perpendicular to each other, then \[ A A' + B B' + C C' = 0; A A' + B B' + C C = 0; A' A'' + B' B'' + C' C'' = 0 \].

Multiplying the first of these equations by \( B' \), the second by \( B' \), and subtracting, we have \[ C (B' A' - B'' A') = (A' A'' + B' B'' + C' C'') = 0 \].

Multiplying the first by \( B' \), the second by \( B' \), and subtracting, we have

\[ B' A' - B'' A' = (A' A'' + B' B'' + C' C'') = 0 \].

Multiplying the first by \( B' \), the second by \( C' \), and subtracting, we have
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A \((A' C'' - A'' C') - B (C B'' - C' B') = 0\).

By means of these three equations the expression for \(L\) is reduced to \(\sqrt{A'' A + B'' B + C'' C}\).

By a similar calculation,

\[L' = \sqrt{A'' A' + B'' B' + C'' C'}\]
\[L'' = \sqrt{A'' A'' + B'' B'' + C'' C''}\]

which gives for the new co-ordinates \(a, v, \omega\),

\[a = A' + B'y + C'z + D' \sqrt{A'' A' + B'' B' + C'' C'}\]
\[v = A' + B'y + C'z + D' \sqrt{A'' A' + B'' B' + C'' C''}\]

The values of \(a, v, \omega\), 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 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 assigned to the three others; but this calculation may be avoided by determining the position of the new axes by means of any three angles \(\alpha, \beta, \gamma\). 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 \(\alpha\) be the angle of the two planes \(x,y\) and \(x''y''\),

\(\beta\) 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 \(\alpha, \beta, \gamma\).

Let \(x', y', z'\), be the co-ordinates of a point referred to the rectangular axes, reckoned upon the three following lines:

1. The intersecting line of the plane \(x'y'y''\) with the plane \(x,y\).
2. The projection of the axis \(z''\) on the plane \(x,y\).
3. The axis \(z''\).

Then \(x = x' \cos \alpha + y' \sin \alpha\),

\[y = y' \cos \beta + x' \sin \beta\],

\[z = z' \cos \gamma\].

Let \(x', y', z'\) be the co-ordinates of a point referred to the rectangular axes, reckoned upon the three following lines:

1. The intersecting line of the plane \(x''y'y''\) with that of \(x,y\).
2. The perpendicular to this line on the plane \(x''y''\).
3. The axis \(z''\).

Then \(x'' = x' \cos \alpha + y' \sin \alpha\),

\[y'' = y' \cos \beta + x' \sin \beta\],

\[z'' = z' \cos \gamma\].

"\(x'', y'', z''\) being the co-ordinates of the point relative to the three axes \(x', y', z'\), we have

\[x'' = x' \cos \alpha + y' \sin \alpha\],

\[y'' = y' \cos \beta - x' \sin \beta\],

\[z'' = z' \cos \gamma\].

Hence \(x = \{x' \cos \alpha + y' \sin \alpha\} \cos \beta + \{x' \cos \alpha + y' \sin \alpha\} \sin \beta\)

\[y = \{x' \cos \alpha + y' \sin \alpha\} \cos \beta + \{x' \cos \alpha + y' \sin \alpha\} \sin \beta\]

\[z = z' \cos \gamma\]

Multiplying these values of \(x, y, z\) respectively by the coefficients of \(x''\) in these values, we have

\[x'' = \{x' \cos \alpha + y' \sin \alpha\} \cos \beta + \{x' \cos \alpha + y' \sin \alpha\} \sin \beta\]

\[y'' = \{x' \cos \alpha + y' \sin \alpha\} \cos \beta + \{x' \cos \alpha + y' \sin \alpha\} \sin \beta\]

\[z'' = z' \cos \gamma\].

And by multiplying the values of \(x, y, z\) respectively by the co-efficients of \(y''\) in these values, and afterwards by the co-efficients of \(z''\), we have

\[x'' = \{x' \cos \alpha + y' \sin \alpha\} \cos \beta + \{x' \cos \alpha + y' \sin \alpha\} \sin \beta\]

\[y'' = \{x' \cos \alpha + y' \sin \alpha\} \cos \beta + \{x' \cos \alpha + y' \sin \alpha\} \sin \beta\]

\[z'' = z' \cos \gamma\].

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 \(\alpha, \beta, \gamma\) the three angles, then \(x = r \cos \alpha, y = r \cos \beta, z = r \cos \gamma\).

Of these three angles two only are necessary; because

\[x' = x \cos \alpha + y \cos \beta + z \cos \gamma\]

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 proceed the radii-rectors of different points in space.

Sometimes the radius vector is projected upon one of the rectangular planes, supposing on \(x, y, \) the angle of the radius, with its projection, is given, as likewise the angle of the projection with the axis of \(x, y, \) if \(\phi\) represent the first, and \(\psi\) the second of these angles,

\[x = r \cos \phi, y = r \cos \psi, z = r \cos \gamma\].

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 \(F = 0\) 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 \(F = 0\), 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 \(f(x, y, z) = 0\), \(f(x, y, z) = 0\), in substituting in these equations the values given by equation \(F(x, y, z) = 0\), we obtain an equation to the curve, relating either to three new planes by the co-ordinates \(x, y, z\), or to a pole, by the radii-rectors, 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 satisfy 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 part of the surface proposed, that is, if even, even, if odd, odd. Thus,
if \( \zeta (r, s, t) = 0 \) be the equation to the surface referred to, any three planes, then, in this equation make

\[ r = x + a_s = y + b_t = z + c; \]

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 supposed to be the centre of the surface; if, by the three particular values assigned to \( a, b, c \), the terms can 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 \( \zeta (r, s, t) = 0 \), the proposed surface will have a centre.

**Of dihlral 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 \( \zeta (x, y, z) \) 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 \( a_o \), function of \( x, y \), and constant quantities, and \( z = o \) will satisfy this equation; therefore, to the same values of \( x \) and \( y \), two values of \( z \) will correspond, differing only in the sign; therefore, the plane of \( x, y \) will be diametral, and for the same 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 \( \zeta (r, s, t) = 0 \) be the equation of the proposed surface; by the transformation of the ordinate, the surface may be referred to three new planes, then \( A \beta + B \beta + C \zeta + D = 0 \); \( A' \beta + B' \beta + C' \zeta + D' = 0 \); \( A'' \beta + B'' \beta + C'' \zeta + D'' = 0 \); in which equation there are nine constant quantities.

The surface proposed has diametral planes, when, by assigning 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, determine 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 variable quantities \( x, y, z \), be \( a x' + b y' + c z' + d x y + e x z + f x z + g y z = 0 \); \( a' x' + b' y' + c' z' + d' x y + e' x z + f' x z + g' y z = 0 \); \( a'' x' + b'' y' + c'' z' + d'' x y + e'' x z + f'' x z + g'' y z = 0 \); the equation there are nine constant quantities.

Making \( x' = x + a_o \); \( y' = y + b_o \); \( z' = z + c_o \), the equation becomes \( a x' + b y' + c z' + d x y + e x z + f x z + g y z = 0 \); \( a x' + b y' + c z' + d x y + e x z + f x z + g y z = 0 \); \( a x' + b y' + c z' + d x y + e x z + f x z + g y z = 0 \); which equation there are nine constant quantities.

This equation, in which the centre, there are 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 \( g' = 0 \); \( k' = 0 \); \( k'' = 0 \), making this substitution and taking only the terms multiplied by \( x', y', z' \),

\[ 2 a z + d y + f x + g = 0; b z + d o + e y + b = 0; 2 e y + e o + f x + b = 0. \]

These equations being linear in \( x, y, z \), their quantities have real values; therefore, surfaces of the second degree have a centre.

If a certain relation be established between the constant quantities \( a, b, c, d, f \), 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 is \( a c' + b f' + c d - 4 a b c - d f = 0 \), therefore, when the following equation fulfils between the constant quantities of the general equation of a surface of the second degree, viz. \( x^2 + b y^2 + c z^2 + 4 a b c - d f = 0 \), 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 \( u, v, w \) for the new co-ordinates, the general equation becomes \( A u^2 + B v^2 + C w^2 + D u v + E u w + F v w + G u + H v + K w + 1 = 0 \); eliminating those terms in which the exponent of any one of the co-ordinates is odd, the fix 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 these 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 these three perpendicular ones, which intersect each other on the three straight 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 six 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, \( L x^2 + M y^2 + N z^2 = 1 = 0 \). We shall first 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, to that after this transformation, the equation to the surface is full of the second degree; moreover, the equations of the sections made on a surface 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 always 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,

\[ L x^2 + M y^3 + N z^3 + p x + q = 0. \]

If in this equation \( f x \) and \( f y \) 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

\[ L x' + M y' + N z' + p = 0. \]

Therefore all curves of the second degree, whose 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

\[ L x^2 + M y^2 + N z^2 - 1 = 0. \]
GEO

Let the equation of any intersecting plane be

\[ z = A x + B y + C. \]

The projection of the intersection of the curve with the surface on the plane \( x y \) will have this equation,

\[
x^2 + (L + N A') + y^2 + (M + N B') + 2 A B N x y + 2 A C N x + 2 B C N y + N C' = 1\]

If the intersecting plane be supposed to change its position by moving parallel to itself, \( A \) and \( B \) will remain constant, and \( C \) only will change its value; hence it follows that the coefficients of \( x', y', x, y \), in the equation of projection, will remain the same, whatever be the value of \( C \). But by the transformation of the co-ordinates this equation may be reduced to this form;

\[ l u^2 + m v^2 + n w^2 + p = 0; \]

in which the coefficients \( l, m, n \) only contain \( A \) and \( B \); \( p \) alone being some function of \( C \). If \( C \) be made to vary, the value of \( p \) may be supposed to become \( p'' \), and the preceding equation to become

\[ l u^2 + m v^2 + n w^2 + p'' = 0, \]

which as it only differs from the former in the constant 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 a diameter of the surface.

If in the equation \( L x^2 + M v^2 + N z^2 = 1 = 0 \) we substitute for the co-ordinates \( L, M, N \), the constant quantities \( \frac{1}{a^2}, \frac{1}{b^2}, \frac{1}{c^2} \), where \( a \) being greater than \( b \), and \( b > c \); it becomes

\[ b' c^2 x^2 + c a^2 y^2 + a b^2 z^2 = a' b' c' (E). \]

The advantage of this substitution is to render the sign of each term of the equation independent of the particular values of the co-efficients, 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 Application de l'Analyse à la Géométrie, par M. Monge.)

The three equations are

\[ b' c^2 x^2 + c a^2 y^2 + a b^2 z^2 = a' b' c' \]

for \( L x^2 + M y^2 + N z^2 = 1 = 0 \) in the ellipsoid and the two others to two different species of hyperboloids.

**Geometry, Character in. See Character.**

**Geometry, Spherical.** See SPHERICAL.

**GEOMORI, Pers.** in Antiquity, the division or class of the ancient Athenians employed in agriculture.

**GEONOMA, in Botany, from geona, a batter out, or distributor of land, alluding to the mode of growth of the first species of the genus in question, as hereafter described.**


Gen. Ch. . . .


Female, Calyx and Corolla like the male. Style one, lateral. Stigma of two lobes. Drupa dry, with one seed.

1. G. pinnatifrons. "Fronds pinnate; the pinnas abruptly jagged."—Native of the Caucasus, in shady woods on the lofty mountain of Bueneva. Brecklay.-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 same height of about fifteen feet, and in its turn is quickly laid prostrate like the former. The fronds (rather leaves) are pinnate, their pinnas irregular, somewhat folded, jagged abruptly at the summit. *Spatha* double, of two valves, wedge-shaped, somewhat compressed, acute, three inches long. *Spathix* fifteen inches in length, branched at the top, the branches round, bearing each from seven to nine alternate, cylindrical spikes, of the length of three inches each. *Flores* conjunctly three, fimbriate in a little hollow of the spike, two of which are male, one female. *Drupa* dry and fibrous, the size of a pea. *Nut globosse*, black.

2. G. simplicifrons. "Fronds simple, wedge-shaped, cloven."—Found at the Caucasus with the former. Brecklay.—The trunk of this is permanently upright, ten feet high, an inch thick. *Fronds* (or leaves) a foot long, simple, wedge-shaped, taper at the base, cloven, and divaricated at the summit, supported on very long flanks. *Spatha* double, of two valves. *Spathix* bearing at its extremity three or four cylindrical spikes. *Flores* imbricated in little cavities, like the former. Wilckens.

**GEOPONIC,** something describing or relating to agriculture. Cato, Varro, Columella, Palladius, and Pliny, are sometimes called geoponic writers.

**GEORG,** in Geography, surnamed the Cappadocius, was made bishop of Alexandria when Athanasius was driven from that see by the persecutions of the emperor Constan- tius, about the year 355. (See ATHANASIUS.) He was a native of Epiphania, in Cilicia, where his father pursued the business of a fuller. From this obscure situation the son raised himself, it is said, not by the most honourable means, to the lation 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 truly infamous. 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 Alexandria, where he professed, great zeal for the Arian system 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 erected in honour of the emperor Trajan, but which was burnt by the connivance of the emperor Jovian. When Athanasius was driven from Alexandria, George was elected bishop by the prevailing party. In this faction his conduct was in the highest degree cruel and oppressive. He persecuted the Catholics with an unrelenting hand, and the other inhabitants of this vast diocese 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 pillaged or insulted by him, who exclaimed, in a haughty and threatening tone of voice, "How long will these sanguine be permitted..."
mitted to stand." The people endured all these acts of oppression till their patience was exhausted; they then rose as one 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 cruelties, 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, which forced open the doors of the dungeons, and with cruel insults massacred the vile wretches. Their lifelike 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 disappoiting the devotion of Christians, who, they foresaw, would gladly canonize the tyrant as a martyr and saint. The fears of the Pagans were just, but their precautions ineffectual. The meritorious death, as it was commemorated, of the prelate, obliterates 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 of the garter. The facts of Cappadocia, Baal, and the Gregories, did not acknowledge their companion, and pope Gelasius, about the year 496, 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 Trebizond**, a learned modern Greek, was born in 1395, in the isle of Crete, of a family originally from Trebizond, from which he derives his name. He came to Italy about 1429, 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 ancient Greek authors into Latin. He was engaged in a similar manner by pope Nicholas V., under whose patronage 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 Fileflo, 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 belles lettres. In 1464 he went to Crete, and pulled thence to Constantinople. On his return he found his own feliciter 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, call into prison, where he was kept during a space of four months. He died about the year 1469. He lived a good old age, and was author of many works on rhetoric and philosophy 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 so far from pure, and in controversy he dealt much in invective. The comparison which he instituted between Aristotle and Plato gave great offence to the adherents of the latter, particularly to cardinal Bellarmino, who wrote an answer to him. Gibbon.  

**George**, called also Amico, flourished about the close of the 16th century, and was at Rome under the pontificate of Clement VIII. He published "A Syriac and Chaldee Grammar" in 4to. in 1596. He was, after this, elected Patriarch of the Maronites, among whom he introduced the afix, and explained the principles, of the Gregorians 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 grand-daughter 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 state 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 Tanningen. He joined the alliance against France in the succession war, and forced the princes of the house of Wolfenbuttle 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 fifty-fourth 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, descended 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 these 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 affirmed, and was the only one that could justify the nation in setting aside the more immediate heirs to the crown, on the plea of difference of religion. (See Whigs.) As soon as this prince was settled 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 imprisoned,
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 1715, the earl of Marl 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 left 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,
with the consent of 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 innova-
tion was a most grofs violation of the principles of the
constitution, which no temporary necessity could
justify. The king had, about this period, acquired by
purchase the duichies 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 czar 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
1718, and the subsequent changes in the politics of Sweden,
put an end to the alarms in that quarter, and secured George
in the quiet possession of his newly acquired continental
ac-
quitions. 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
feizure 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 success
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 na-
tional delusion and calamity in the year 1720, (see BUBBLES)
recalled the king from a visit to his German dominions, and
the prudent measures of parliament produced the restoration
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. Atter-
bury, bishop of Rochester, who was punished with perpe-
tual banishment. The ministers of France and England,
Flurry 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 trifling other priv-
ete ends were to be answered by them. The leading
principle of George I. was the fcurity and prosperity of his
German dominions, to the interets of which, those of
Great Britain were, on various occasions, said to be sacri-
ficed. In 1725, a treaty between the emperor and the
king of Spain excited the jealousy of king George so much,
that he counterfeited it by another at Hanover, comprizing
most of the other European powers, and he sent a fleet to
the Weft Indies under admiral Hosier, in order to block up
the Spanish galleons at Portobello. The death of the ad-
miral and most of his crew from disease, was considered as
one of the most inglorious disasters of the reign. The Spa-
niards then besieged Gibraltar, but all differences were finall
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
encourage him. The arts, letters, and sciences, which he had flourished 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 elec-
toral dominions, and embarked for that purpose at Green-
wich, June 5, 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 foi de
moi." He reached the palace of his brother, the bishop of
Olmuth, but could not advance farther. He died June 11,
1727, in the sixty-eighth year of his age, and the 15th 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 whose society he was fond
of relaxing from the cares of the state. He possessed much
natural prudence and good fen's, and well understood his
interests, at least as far as the objects nearest his heart were
concerned. Accoding 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 influenced 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 Dorothea, 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 between father and son, the latter lived for some
time in a state of estrangement 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 shewed to 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 function, or the law by
which the female heirs of the emperor Charles V. were to
succeed to the hereditary dominions of Austria. In 1732
Walpole introduced into parliament the financial scheme of
a great extension 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 govern-
ment for abridging liberty, by a bill for limiting the number
of playhouses, and submitting dramatic writings to the
inspection of the lord chamberlain. Debates had long pre-
valled

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vailed 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 strip his daughter Maria Theresa of her inheritance, which had been guaranteed to her by the Pragmatic sanction. In defence of her just rights, 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 Britons, 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 1745, 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 ion, 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 south, 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 negociated, 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 necessarily imposed by a state of war.

In 1751, the king left his eldest son Frederic, who had lived a considerable time at variance with his father, but who had made his peace with the court after the dismission of Walpole. This prince, the father of our present sovereign, was amiable and well disposed, and the fond and gouty hopes had been entertained of the patroition which he would be exhorted to bestow on the person 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 appreciations 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 conflict 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 success 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 reproached 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 25th 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 hasty and obdurate in his temper, yet a natural goodliness of heart, a love of justice, and an honest openness of disposition, conciliated the affection of his people, and have infused respect and veneration for his memory. He was a firm friend to the established 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 modified, 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 for conscience sake." On various occasions he had given signal 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 classed with 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 ΑΡΙΣΤΟΣ ΓΕΡΜΩΝ, q. d. great martyr.

On some medals of the emperors John and Manuel Comneni, we have the figure of St. George armed, holding a sword or javelin in one hand, and in the other a buckler, with this inscription; an O, and therein a little P A, and ΓΕΡΜΩΝ, making Ο ΑΡΙΣΤΟΣ ΓΕΡΜΩΝ, 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 Armenia, Muscovy, and
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 Capadocia.

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 St. 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 Constatine the Great, in the year 312. The collar is composed of fifteen oval plates of gold, richly chafed on their edges, and enameled blue. On 14 of these plates is the cypher of the name of Christ, composed of the Greek capital letters Χ and Π between the two capitals A and N, signifying that Jesus Christ is the beginning and end; but on the centre oval, which is edged with laurel leaves, the cypher ΧΡ is placed on a cross potence gules, edged or, and having on its points the letters I, H, S, V.; and pendent from the bottom 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 1293; 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 Milans, 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 the parish church of Rougemont. 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 re-founded by the last emperor Maximilian, who directed that the badge of the order should be a cross crozets bottonnee gules, encircled on the upper arm with a diamond coronet or, and worn pendent from three chains of gold.

The order of St. George at Genoa was instituted in 1477. The doge of Venice is perpetual grand master of the order. The ensign 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, in enamel, the 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 1572.

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 perfon admitted into this order must prove his fertility 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 horshack, slaying a dragon; the cross is enamelled blue, and edged with white, and cantonned with a smaller cross, enamelled blue and white; which, pendent to a sky-blue watered ribbon, edged with white, is worn scarfiwife. On the left breast 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 key-mitaris, 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 emperors Catherine II. in 1769, has the precedence over that of St. Anne of Holstein, and was divided into four classes. —

The badge is a cross 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 salary of 500 roubles = 1400; each of the second class has 400 roubles = 800 a per annum; each of the third 200 roubles or 200 a per annum; and each of the fourth 100 roubles or 100 a per annum. The fund of this order, assigned by the emperors for the payment of their salaries, and other expenses, is 40,000 roubles = 80,000 a per annum. Of this 1,680 is devoted to the payment of the order 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 rank of an officer 25 years by land, or 18 by sea.

The order of St. George of Alkama, or the order of Menteia, an order of knights in Spain. When the order of knights-templars became extinct in Spain, an order was instituted, about the year 1317, to supply their places, and in consequence of a permission for that purpose obtained from pope John XXII. at which time Montefia 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 Montefia 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 Montefia. 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 scarfiwite, pendent to a broad red watered ribbon. The order of St. George of Alkama, was instituted about the year 1201, at a town of that name in the diocese of Tortosa. In 1399 this order was united to that of Montefia, by pope Benedict Xuli, and that union was confirmed in the council of Constance.

George, Religions 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

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of pope Boniface IX in the year 1404. The foundation of this order was laid by Bartholomew Colonna, 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 islet, near the west coast of Sumatra. N. lat. 3° 48'. E. long. 96° 12'.

George Cape, a cape on the S. coast of Kerguelen's Land. N. lat. 49° 54'. E. long. 70° 13'.—Also, a cape on the W. coast of Newfoundland. N. lat. 42° 28'. W. long. 59° 17'.—Also, a cape on the N. coast of the island of South Georgia. S. lat. 54° 17'. W. long. 30° 32'.—Also, a cape on the coast of Peru. S. lat. 23° 50'.—Also, 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. 45° 30'. W. long. 59° 40'.—Also, the southern extremity of New Ireland. S. lat. 3°. E. long. 152° 15'.

George Creek, a town of America, in Allegany county, Maryland; 152 miles from Washington.—Also, a river of America, which runs into the Potowmac; 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 1774, in the passage from the Marqueñas to Otaheite. One of these islands, called by the inhabitants "Tiookea," 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 isles, are of a much darker colour than those of the higher islands, and seem to be of a much merrie disposition; which captain Cook attributes to their situation. Nature not having bestowed her favours on these low isles with that profusion she has done to some others, the inhabitants are rigidly induced to the food for their subsistence; consequently they are exposed to the sun and weather, and thus become much 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., two leagues distant from the west end of Tiookean; and the middle is situated in S. lat. 14° 37'. 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 had. These furnished them with almost all the necessaries of life, particularly food, fish, 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 coco-nut branches, were females near groves of these trees. Scurry-grafs was obtained in great abundance. Their canoes, which they are dextrous 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 falls, which hung from the waist as low as the knee; but the men, were stark 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. Fresh water is scarce. 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.—Also, 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 "Sacrament." This lake is about 36 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 cedar, fpiece, and hemlock trees and shrubs, and abounding with rattle-snakes. 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 stands on the north side of the outlet of the lake, where it discharges its water into lake Champlain, is now in ruins.—Also, 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 Stand. See NOOTKA.

George, St., the largest of the Bermudas islands, about 15 miles in length, and 8 in breadth, containing about 500 houses, surrounded and defended by a chain of forts, 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 assemble, a handsome church, and a library. N. lat. 32° 40'. W. long. 63° 32'. (See BERMUDAS).—Also, a town, or rather village, nearly in the centre of Newchester county, in the state 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.—Also, a town and capital of the island of Grenada, and also one of its five parishes, formerly called by the French "Fort Royale." It is situated in a spacious bay, on the west side of the island, not far from the south end, and possesses one of the fairest and most commodious harbours in the English West Indies, which has been lately fortified at a great expense, and being one of the ports of entry belonging to the island was made a port of entry 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
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 landlocked, and in deep water close to the wharfs. On the ridge between the two towns flanks 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 stone, and is large enough to accommodate an entire regiment. N. lat. 35° 35'. W. long. 59° 31'. Edwards' "Well Indies," vol. ii.—Allo, 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 considerale trade. N. lat. 38° 58'. W. long. 24° 37'.—Allo, a small island in the Grecian Archipelago, three miles E. of Milo.—Allo, a small island in the Grecian Archipelago, at the entrance of the gulph of Sardarick. N. lat. 39° 48'. E. long. 26° 43'.—Allo, a small island in the Gulf of the Nile, near the coast of Egypt; four miles from Goa. Allo, a town of France, in the department of the Maine and Loire; 20 miles S.S.W. of Angers. Allo, a large and deep bay on the W. side of Newfoundland. N. lat. 48° 12'. Allo, 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 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. Allo, a river of St. Mary's county, in Maryland, which is a broad but short creek, having its mouth between Piney 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 Massachusetts, E. of cape Cod. It extends from north to south between 47° 15' and 43° 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 Orof. St. George's Channel, that part of the Atlantic ocean which is situated between Ireland and Wales. Allo, a strait of the Pacific ocean between New Britain and New Ireland, 500 miles in length. Allo, a strait between the little Nicobar and Sandwidge islands, in the East Indian sea. St. George's Iland, a small island in the mouth of the river Potomack. N. lat. 38° 13'. W. long. 76° 34'. St. George's Ilands, a cluster of small islands near the coast of East Florida, opposite to the mouth of the Apalachicola. Allo, 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'.
to the western country. Alto, 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 Potomac river, separated eastward by Rock creek from Washington city, and distant 4 miles from the capital, and 9 N. from Alexandria. The houses, which are about 250, 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; 46 miles S.W. by W. from Baltimore, and 148 S.W. from Philadelphia. 

The six towns in the state, and in the county of Oglesby, 50 miles S.W. of Augusta, in the midst of a poor country, but indicating prosperity. Alto, a large maritime district in the lower country of South Carolina, situated in the N.E. corner of the state. Horry and Marion districts have lately been taken from this territory, leaving 29,532 inhabitants, of whom 16,620 are negroes. Alto, a post-town, and port of entry, and capital of the last-mentioned district, situated on a spot near which several streams unite their waters, and form a broad water called "Winyaw" bay, 13 miles from the sea. It contains 3 or 400 dwelling-houses, built chiefly of wood. The public buildings are a court-house, jail, 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° 57'. W. long. 79° 35'. Alto, a town of Kentucky, on the Elk-horn; 26 miles E. of Frankfort. N. lat. 38° 5'. W. long. 84° 50'. Alto, a town of New Brunswick, on the river St. John. N. lat. 45° 48'. W. long. 66° 12'. Alto, a town on the east coast of the island of St. John, on the gulf of St. Laurence. Alto, a town of the slate of Georgia; 20 miles N. of Waynesborough. Alto, 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'.

GEORGIA, in Botany, Ehrhart Bev. v. i. 176, so named by that author after his majesty George III. king of Great Britain, when he established, as a new genus, the flowers called by Linnaeus Minumium pillulatum. All botanists, nevertheless, have preferred the name Tropis, given by Hedwig to Pian's Monograph, i. 1. It seems, however, that there ought to be a Georgia after Georgi the Russian traveller and botanist. See GEORGIA.

GEORGIA, in Geography, a country of Asia, between the Caspian and Black Seas, and particularly appropriated to the territory that lies between the Caspian Sea and Mingrelia, anciently known by the name of "Iberia." The ancient

Iberia, which lies to the west, is now chiefly the "Immeritia" of European Turkey, on the other side of a branch of the Caucuses. Georgia, or more properly "Gurgia," including Daghelitan 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 Gruzinia, is divided into two considerable Christian states. One of these, bounded by the Black sea, contains the kingdom of "Immeritia," and the principalities of "Mingrelia" and "Guriel," (which see respectively,) and is now governed by a common prince, who bears the title of tsar or czar. Each of these states had formerly its own ruler, all acknowledging the supremacy of the Grand Sultan, to czar Solomon united them under his authority, and freed them from the paramount Ottomans. Solomon, having upon his accession forbidden the scandalous traffic practiced by the nobles of selling their peafants, 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 affaifination, 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 Immeritia, and by wearing boots. He had no regular troops, but collected a defultory army of 6000 men, without artillery. These troops were drawn together by the found of the trumpet; in other respects the prince's orders were infribed at the markets, which are held every Friday. One of his fervants ascended 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 1783 his embassadors were introduced to the empress at Peterburg, and, in the eastern style of homage, threw themselves on the ground at her feet.

The second Georgian state consists of the principalities of "Kardelia" or "Cardelia," (Kartalnia) and "Kakhetty," which have been long governed by Christian princes, in submition to the Persian empire, but, since the shock sustained by the throne of the Sophis, 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 Karducla and Kakhett borders northwards on the Karda, eastwards on Daghelitan and Schirvan, (which see respectively,) southwards on the Persian Armenia, and westwards on Immeritia. The capital is Tiflis (which see). The czar, or prince Heraclius, who is celebrated for his bravery and other great qualities, as well as by the important part which he acted during the disturbances that agitated Persia after the death of Tamas Kulian, 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 1786, in order to escape the connection with it, and to acknowledge himself tributary to the Porte; but he died soon afterwards. Within a few years past the Russian interests revived, and prevailed; and in February 1801, Georgia was by a public ukase united to that empire. The Georgians or Gruzinians, as they are sometim
GEORGIA.

times called, avoided all communion with the Tartars, and have distinguished themselves as the most numerous and powerful body of the mountaineers of Caucasus, now for the greatest 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 soldiers in Asia. The women are celebrated for their beauty, but though they are very handsome 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 are fine, handsome, virtuous, and courage; fathers sell 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 Leagues Tartars, who, situated between the Caspian 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 Turfik merchants, who come thither at stated times for this traffic. The inhabitants of this same 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 game is of excellent flavour, and the wild hogs are delicate. The inhabitants make wine, which they sell into Armenia and Persia, especially to Isphahen, for the king's table. Silk forms a considerable branch of trade to Erzerum; 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 Al. 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 Earl and West Florida; W. by the river Missippis; N.E. and N. by South Carolina, the Tennesse state, or by lands ceded to the United States by South Carolina. Its population is estimated, by the census of 1790, at 85,528 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 farther security of Carolina. The benevolent and humane proposed to raise a fund for conveyingligrant emigrants to this part of America, free of expence. 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 amity 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 400 British subjects, and about 170 foreigners. Afterward, adventurers from Scotland, Germany, and Switzerland followed the colonymen, and contributed to encourage the hopes of the proprietors as to the permanence and prosperity of the colony. Several towns were built, and, in 1739, more than 600 people were employed in trading with the Indians for furs and skins. 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 desirous of fixing in a more favourable situation. It was thus found that the system 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 possessions, 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 last regulation, however, which 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 lands granted by the trustees were not cultivated, cleared, and fenced round with a wooden fence, or pales fix feet high, within 18 years from the date of the grant, such part was to revert to the trustees for the benefit of the colony. It was forbidden to purchase, or export rum, and to trade with the Indians without a special licence obtained for this purpose. Under these restraints the province languished, and the people complained; till at length the trustees, 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 sensibly felt, and its annual exports, which in 1752 amounted to no more than about 10,000l. sterling, were very much augmented; and its population and agriculture proportionally 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 1790, the state of Georgia has been rapidly advancing in every kind of improvement.

Since
GEORGIA.

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, Wallingford, Hancock, Greene, Franklin, Oglethorpe, Elbert, Wilkes, Lincoln, Warren, Jefferson, Jackson, Bullock, Columbia, and Richmond; the latter contains nine counties, viz. Camden, Glynn, Liberty, Chatham, Bryan, McIntosh, Effingham, Screven, and Burke. The principal towns are Augusta, formerly the seat of government, Savannah, the former capital of the state, Sumbry, Brunswick, Frederica, Wathington, 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 Altamaha, which runs parallel with the others. Besides these and their numerous branches, we might mention Turtle river, Little Stitilla, Great Stitilla, 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 Wester territory," will be noticed in another place. All these rivers contain a plentiful supply of various sorts of fish, as rock, mullet, whiting, shad, trout, drum, baf, cat fish, whiting, brim and flounder; and the bays and lagoons afford oysters, and other shell fish. The chief lake, or marsh, in this state, is Ekananoka, called by some Ouaquaphenogaw, which is 300 miles in circumference. The eastern part of the state, between 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 furnace. At the distance of about 40 or 50 miles from the sea-board, or salt-marsh, the land gradually rises to mountains. The vall chain of the Alleghany 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 foil, 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 lively febrile, 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, pleuridies, peripneumonies, and other inflammatory disorders, produced by colds, are common, and frequently fatal. The winters 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 luscious, and the water good and abundant. From June to September the mercury in Fahrenheit's thermometer fluctuates from 70° 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, fullery, and infalburious. In the S. E. parts of the state, the trade winds impart their agitation to the atmosphere, and serve to purify and mollify 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, silk, corn, potatoes, oranges, figs, grapes, pomegranates, &c. The four woods of oak, hickory, mulberry, pine, cedar, &c. The whole state is bordered with islands, of which the principal are Skidaway, Wadsaw, Ossabaw, St. Catharine, Sapelo, Frederica, Jekyll, Cumberland, &c. These islands are surrounded by navigable creeks, between which and the main land is a large extent of fall-march at a medium four or five miles broad, fronting the whole state, and intersected 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 fall 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 earth, which renders it very fertile and yields, by cultivation, good crops of indigo, corn, cotton, and potatoes. The soil of the main land, adjoining the marshes and creeks, resembles 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, confiding of a black and red earth. This fort of land is generally strong, and yields large crops of wheat, tobacco, corn, &c. This soil is succeeded by another, nearly black, and very rich. This succession 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, figo, limber, naval flowers, leather, deer skins, snake root, myrtle and bees wax, corn, and live flock. The value, in sterling money, of the exports of Georgia, in the year 1755, was 15,744; in 1762, 121,677; in 1791, value in dollars, 491,472; in 1792, 456,973; in 1793, 501,383; in 1794, 676,154; in 1795, 950,158; and in 1801, 1,854,495. In 1795, the tonnage employed in this state was 28,450, and the number of American vessels was 11,225. In return for her exports, Georgia receives West India goods, teas, wines, clothing, and dry goods of all kinds: from the northern states, chee, fish, potatoes, apples, cyder, and horses. 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 prised for their freckledns 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 Baptist, Methodists, Presbyterians, Episcopalian, Roman Catholics, Quakers, and Jews. The two first are the most numerous; the third, fourth, and fifth are about equal in number; and the Catholics and Jews have each of them one church. The civil
Constitution of Georgia was adopted and ratified by a convention of delegates from the people, on the 6th of May, 1777, and is formed 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 is held at 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 commissions 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 legislatures. 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 generally advancing towards higher degrees of improvement. For this purpose a college is established at Louisville, with liberal endowments; and in subordination to this it is propounded to found academies in every county of the state. This institution is denominated the "University of Georgia." The funds for its support consist of about 35,000 acres of valuable land, together with nearly 6666 acres of land in bonds, houses, and town lots in Augusta. Other property also, to the amount of 6666 acres, 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 south of Savannah, consists chiefly of rice plantations and negroes. On the death of the countess of Huntingdon, 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 Muscogee 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, Chickasaw, 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, Tombalbeeke, Escambia, and Chatta Hatta, which fall into the gulf of Mexico; and the Tennessee Bend, with Chucquamaga river, which falls into it from the south-east, water its northern part. Twenty millions of acres of this territory was sold in consequence of an act of the legislature, passed in 1793, to certain companies; and the purchase money, amounting to $5,000,000, 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 transaction 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. More. 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 53° 57' and 54° 37' S. lat., and between 33° 13' and 35° 34' W. long. It extends S. E. by E. and N. W. by W., and in that direction is 31 leagues long, and its greatest breadth is about 10 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 vast quantity of ice; or, at least, it must be dangerous lying in them, on account of the breaking up of the ice-bergs, by which the coast is bounded, and which rise up perpendicularly in masts of very considerable elevation. When the fall they float about in the sea like detached islands, and in falling make a noise like that of a discharged cannon. The inner parts of the country exhibit an appearance not savage and horrid 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 slates, 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 coarse strong-bladed grass-growing in tufts, wild burnet, and a plant like masts, which spring 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 these, the oceanic birds were albatrosses, common gulls, and that fort called by Cook Port Egmont lans, terns, frigate birds, divers, the new white bird, and a small bird like those 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 hawks; but our navigators found no quadrupeds. The dung of one was seen, suppos'd 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 south 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. 38° 23'; which was called "Willis's island," which was a high rock of no great extent: call of this, between it and the main, they observ'd...
ed another island, to which, on account of the number of birds they saw on 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 passages between these two islands, they pursed their coasting voyage to "Cape Buller," and at length arrived at a bay, which they denominated "Pojeeion 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 islands," so named on account of several small 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 "Pickering 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 1068 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 Quendra 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 GEORGIIUM SIDUS, 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 inferred 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 not being so brilliant, he suspected that it might be a comet; in consequence of which he observed it with different magnifying powers, from 227, with which he discovered it, to 200, and found that its apparent magnitude increased in proportion, contrary to what takes place in the fixed stars. He therefore measured its distance from one of the neighbouring fixed stars, and comparing its distance for several nights he found that it moved at the rate of about 41" 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. Maldeley, who at once 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 parabolic distances, 6, 8, 10, 11, 12, 14, 16, and 18 times the earth's distance from the sun, and found that any parabolical distance between 14 and 18, would answer very well to the observations. Boscovich printed a memoir on the subject, in which he showed 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. Maldeley'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 Sci. 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° 1° 7' 49&quot;</td>
<td>3° 1° 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>4 9 7 13</td>
<td>8 21 21 50</td>
</tr>
<tr>
<td>Log. of the sun's distance</td>
<td>0.003106</td>
<td>0.006272</td>
<td>9.592993</td>
</tr>
</tbody>
</table>
GEORGUM SIDUS.

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 Edin. 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' 33'</td>
<td>3° 0' 52&quot; 11&quot;</td>
<td>1° 7&quot;</td>
</tr>
<tr>
<td>26, 1782, 8 56 56'</td>
<td>3 5 20 29</td>
<td>18 56</td>
</tr>
<tr>
<td>31, 1783, 0 46 24'</td>
<td>3 9 50 52</td>
<td>22 10</td>
</tr>
<tr>
<td>Jan. 3, 1785, 17 28 56'</td>
<td>3 14 23 2</td>
<td>25 40</td>
</tr>
<tr>
<td>8, 1786, 10 39 31</td>
<td>3 18 57 5</td>
<td>28 52</td>
</tr>
</tbody>
</table>

From which the following elements were obtained:

- Mean distance
- Eccentricity
- Periodic time
- Mean anomaly at the 5th opposition
- Long. of apogee
- Long. of the node
- Inclination of the orbit
- Equation of the centre

The elements, as given by La Place, 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' 33'</td>
<td>3° 0' 52&quot; 11&quot;</td>
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</tr>
<tr>
<td>26, 1782, 8 56 56'</td>
<td>3 5 20 29</td>
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</tr>
<tr>
<td>31, 1783, 0 46 24'</td>
<td>3 9 50 52</td>
<td>22 10</td>
</tr>
<tr>
<td>Jan. 3, 1785, 17 28 56'</td>
<td>3 14 23 2</td>
<td>25 40</td>
</tr>
<tr>
<td>8, 1786, 10 39 31</td>
<td>3 18 57 5</td>
<td>28 52</td>
</tr>
</tbody>
</table>

From which the following elements were obtained:

- Mean distance
- Long. of apogee
- Long. of the node
- Inclination of the orbit
- Equation of the centre

The diameter of this planet is about 4 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 serene, it appears like a fixed star of the seventh magnitude with a blueish 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 six satellites, all of them discovered likewise by Dr. Herichel. 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 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° 39', supposed feet 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. 91:008

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 38 26</td>
</tr>
<tr>
<td>II.</td>
<td>8 37 08</td>
</tr>
<tr>
<td>III.</td>
<td>11 06 41</td>
</tr>
<tr>
<td>IV.</td>
<td>13 45 59</td>
</tr>
<tr>
<td>V.</td>
<td>18 27 20</td>
</tr>
<tr>
<td>VI.</td>
<td>23 01 40</td>
</tr>
</tbody>
</table>

La Place concludes 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 apogee, and node, together with the arguments II., III., IV., 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 apogee 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 day of the month.

Under these write down (Table IV.) the mean motions of the same, for the given hour of the day.

Under these write down (Table V.) the mean motions of the same, for the given 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 100 in the arguments II., III., V., VII., VIII., or any multiples thereof, and you get the mean longitude, the apogee, and node, for 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.

Before 1789 the secular variation must be taken with a sign opposite 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.

From the longitude thus found, subtract the longitude of the node, and you have argument IX.

With argument IX. enter Table XVII. and take out the reduction to the ecliptic, with its proper sign, making a proportion for the minutes and seconds of the argument; and this applied to the longitude of the Georgian in his orbit, gives his true heliocentric longitude on the ecliptic, reckoned from the mean equinox.

With argument IX. enter Table XVI. and take out the latitude, making a proportion for the minutes and seconds of the argument, and you have the true heliocentric latitude of the planet.

With the mean anomaly enter Table XIV., and take out the radius vector; and correct it by the following Table XV., and you have the true distance of the planet from the sun, that of the Earth being unity.

**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>Apheion</th>
<th>Node</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>November</td>
<td>S. D. M. S.</td>
<td>S. D. M. S.</td>
<td>S. D. M. S.</td>
<td>S. D. M. S.</td>
</tr>
<tr>
<td>26'</td>
<td>6 12 41.4</td>
<td>12 48 5</td>
<td>12 48 5</td>
<td>12 48 5</td>
</tr>
<tr>
<td>16'</td>
<td>3 34 39.8</td>
<td>4 4 0</td>
<td>4 4 0</td>
<td>4 4 0</td>
</tr>
<tr>
<td>14'</td>
<td>3 21 45.5</td>
<td>6 44 19</td>
<td>6 44 19</td>
<td>6 44 19</td>
</tr>
<tr>
<td>Sum of eight</td>
<td>3 17 11 56</td>
<td>3 17 11 56</td>
<td>3 17 11 56</td>
<td>3 17 11 56</td>
</tr>
<tr>
<td>equations</td>
<td>4 12 48 19</td>
<td>1 23 56 7</td>
<td>1 23 56 7</td>
<td>1 23 56 7</td>
</tr>
<tr>
<td>Longitude in orbit</td>
<td>4 6 44 17</td>
<td>8.9</td>
<td>Arg. IX.</td>
<td>Arg. IX.</td>
</tr>
<tr>
<td>Heliocentric longitude</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>37° 2' 9</td>
</tr>
<tr>
<td>Heliocentric latitude</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>37° 2' 9</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 table, 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 $422^\circ$ is $3 26 59.6$, and the variation or $60^\circ$ is $431.1$; hence $60^\circ: 54 15' : 1 31.1 : 35'.1$, which (as the equation is decreasing) subtracted from $-32659.6$ gives $-23254.5$, the equation required. And to find the secular variation, that variation is $+7.44$ for $42^0$, and it decreases $0.16$ for $60^\circ$, hence $60^\circ: 54 15' : 0.16 : 0.15$, which taken from $+744$ leaves $+729$, the secular variation corresponding to the given argument. Now this secular variation is reckoned from 1780, and from thence to November 26, 1789, there has elapsed 99 years; hence $100: 9.9 : +729 : +0.7$ the secular variation for 99 years. With argument II, 628, take the equation from Table VII. Now the equation for 628 is $4.7$, and it changes $0.7$ for 10; hence $10: 8 : 0.7 : 0.6$, which as the equatio
rion decreases, subtracted from 4°.7 leaves 4°.1, the equation required. By proceeding thus to argument VIII, we get all the equations, and by taking the difference of the positive and negative parts, we get 3° 21' 45".5 for the value of the first eight equations; which applied to 4° 10" 6' 11".4 gives 4° 6' 47" 25'.9 the longitude of the Georgian in his orbit. From this longitude subtract 2° 12' 48" 19" the longitude of the node, and we get 1° 23' 56" 7", which is argument IX; with which enter Table XVII. and take out the reduction, which is 8°.9, and this applied to 4° 44' 25".9 gives 4° 6' 47" 17", the heliocentric longitude of the Georgian on the ecliptic from the mean equinox. Also with argument IX, enter Table XVI. and take out the latitude. Now for 1° 23' the latitude is 36° 57", and it increases 28°.8 for 60°; hence 60° : 56° 7° : 28° 8° : 26° 9°, which added to 36° 57" gives 37° 23".9, the heliocentric latitude of the Georgian.

Table I.

Epochs of the mean Longitude of the Planet, with the Arguments of the Equations.
### GEORGium Sidus.

#### Table II. — Mean Motion of the Planet for complete Julian Years.

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In the Bif textiles day must be subtracted for the months of January and February.
### Table VI.

Equation of the Orbit for 1780, with the secular variation to be applied to the longitude.—Before 1780, this secular variation must be applied with a contrary sign.

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GEORGium SİDUS.

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### GEORGIMUM SIDUS

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## GEORGIUM SIDUS.

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GEORGIIUM SIDUS,

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Argument IX. Long. of the Planet — long. of Node.
GEORGUM SIDUS.

Table XVII.

Reduction to the Ecliptic and Logarithm of the Cosine of the heliocentric Latitude.

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GEORGIAN Bible. See Bible.

GEORGIAN Monks and Nuns, are religious of Georgia, in Alia, 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.


gEOGR, something that relates to the culture or tillage of the ground.
The word is borrowed from the Latin geographus; and that of the Greek γεογραφικός, of γη, earth, and γραφή, a book, I work, labour, of γράφω, to write. The Geographies of Virgil are four books composed by that poet on the subject of agriculture.

GEORGEV, in Geography, a town of Rufia, in the government of Caucausus; 22 miles W.N.W. of Ekaterinograd.

GEORGIA, in History, so named by Willemow in honour of Professor Georgi; see Georgia, and DAHLIA.

GEORGITZ, in Geography, a town of Walachia; 18 miles N.N.E. of Bucharest.

GEOSCOPY, a kind of geography, or knowledge of the nature and qualities of the ground or soil, gained by viewing and considering it.
The word is formed of the Greek γθ, earth, and σκόπεω, to view.

GEOSTATICS. See Statics.

GEOPHRUS, in Ancient Geography, a town of Syria, according to Polybius, which surrendered to Antiochus.

GEOPHYRA, a town of Syria, in the Seleucide 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 Macros.

GEOPHYRAEI, 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 Bectos, they took refuge in Attica.

GEOPIDE, a people of Scandinavian origin, of whom the Gothic extraction Jornandes gives the following account: the Goths, leaving Scandinavia under the conduct of King Barth, put to sea with only three ships. One of these, falling short of the other two, was thence called "Geopanta," signifying in the Gothic tongue: and hence the name of Gepantia 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 Gepides, were originally the same nation; and that they had the same customs, manners, religion, and language; and that they only differed in names, borrowed, perhaps, by them from their different leaders. They entered Scythia with the other Goths, and settled in the neighbourhood of the Tanais and Pulas Meritis. 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 neighbourhood of Singidunum and Sirmium, about the year 450, when they still were when Procopius wrote his history. They had kings of their own, and formed a distinct nation, separate from both the Ostrogoths and Visigoths; but perhaps not one from the Lombards, who were afterwards masters of Italy. Under their king Fafid, they gained a complete victory over the Burgundians about the year 245; and Fafida, elated with this victory, laid waste the territories of the Goths, whose sovereign Olrogotha refused to grant them land for their accommodation. Being defeated by the Goths, they afterwards joined them, and other northern nations, in the irritation 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. Jerome mentions the Gepidi among the other nations of Barbarians, who, in 407, invaded Gaul, and overran its provinces. Attila afterwards subdued them, and in 451 they served under him in his famous expedition into Gaul. Upon the death of Attila, the Gepids shook off the yoke under the conduct of their king Ardari, who obtained a complete victory over the Huns; in consequence of which the Gepids not only recovered their ancient liberty, but gained possession of ancient Dacia, N. of the Danube, from 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 them joining the Heruli, and plundering the neighbouring provinces, they were compelled by Justinian, after several encounters, to abandon Illyricum, and to content themselves with Dacia beyond the Danube. In the year 550, a quarrel arose between the Gepid and the Lombards; but the latter, having obtained a reinforcement from Justinian, 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 Justinian. The peace, however, was of short duration. Under their respective sovereigns, viz. Cumidius, king of the Gepide, 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 Gepids were put to flight, and pursued by the victorious Lombards with such slaughter, that scarcely one was left alive of the numerous multitude that had engaged. After this victory the Lombards seized the whole of Dacia, and obliged the Gepids 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, Justin, the successor of Justinian, being then emperor.

GEPE, in Geography, a river of Germany, which rises near Neustadt in the county of Mark, and runs into the Bigge, two miles N. of Olpe, in Westphalia.

GER. CAPE. See Auch.

GERA, a town of Saxony, in the Vogtland, on the Elbe; 30 miles S.S.W. of Leipzig. N. lat. 50° 49'. E. long. 12° 6'.—Allo, a town of Italy, in the department of the Upper Po.—Allo, a river of Germany, which runs into the Unfrull, six miles N. of Erfurt.

GERA, in Ancient Geography, a town of Arabia.

GERT. A, a town of Lusitania. Portus.

GERÉS.
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 Carythus; now Erecho.

GERALFINGEN, 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 Drostenheim; 22 miles S.S.W. of Romildal.

GERANIA, in Botany, the 73d natural order in Jussieu's system, or the 13th of his 15th classes. The following is his definition of this, one of his most important and extensive classes. Cotyledons two. Petals many. Staminens inferred below the germien. — The Calyx is of one or many leaves, very rarely deficient. Petals hypogynous, or inferted below the pistil, definite in number, very rarely indefinite, for the most part distinct, but sometimes connected at the base, into a sort of scale monopetalous corolla; they are rarely wanting. Stamens inferred below the pistil, definite or indefinite, the filamenta often distinct, sometimes united all together into one tube, more rarely collected into several bundles; anthers distinct, or united only in Vilia and Impatiens (called Balsamina by Jussieu). German superior, in manyimple, in some multiplied; style simple, 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 Gerania is thus defined by Jussieu. Calyx simple, either of five leaves, or of one deeply five-leafed, permanent. Petals five. Stamens definite, their filaments united at the base, sometimes all fertile, sometimes part of them abortive. German simple; style one; stigmas five, oblong. Fruit either of five cells, or of five capsules, each cell or capsule containing one or two seeds. Capsules without a peri camb, (or albumen). Stem either somewhat flabby, or hercaceous. Leaves with stipules, opposite or alternate. Flowers, in the former cafe, opposite to each leaf; in the latter, axillary.

Jussieu enumerates only two genera as properly belonging to this order, Geranium, which includes Eroditum and Pelargonium jullly separated from that genus by the late M. L'Héritier; see Eroditum; and Monfonia, which is but too nearly akin to Geranium. He subjoins three genera as related to this order; Tropaeolum, whose affinitie is very obscure; Impatiens (his Balsamina), which is perhaps still less akin to it; and Oxalis, which last we would rather refer to the Rutaceæ, an order which Jussieu sees but imperfectly to have studied. He indeed, like Linnaeus, hints some relation between Oxalis and Tribulus or Zygoophyllum, both which last he fixations in the first section of his Rutaceæ; but we presume to think they are there misplaced, and that Oxalis is not so much allied to them as to the real Rutaceæ, 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 conjecture, humility and candour are most becoming, we merely aim at collecting observations. The unnatural combinations complained of in a systen professedly artificial, cannot be half so hurtful as error masked in authority in the details of a pretended natural one. The doubts and lents of the excellent Jussieu are in themselves instructive, but how few are content like him to confede 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 novelty of New Holland, have given ample scope to his intelligence and affility.

GERANIA, in Ancient Geography, a town of Thrace. — Allo, a town of Phrygia. — Allo, an ancient town of the Peloponnesus, in Laconia, on the confines of Messenia. — Allo, a mountain of Greece, in the territory of Megariss, towards the illims of the Peloponnesus.

GERANIS, or GERANIUM, in Surgery, a bandage formerly applied to fractured collar-bones, and dislocated shouldcrs. The word is derived from γέρανος, a crane, because the shape of the bandage was thought to resemble an extended crane.

GERANITES, γέρανιτες, a crane, in Natural History, a name given by some authors to such pieces of agate, or any other of the semi-precious gems, as have round spots in them, resembling in clothe the eye of a crane.


Gen. Ch. Cal. Periathan 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 longer, all shorter than the petals; anthers oblong, ventive, five of them occasionally abortive. Pet. Germin superior, with five furrows, beaked; style central, awl-shaped, longer than the filaments, permanent; stigmas five, oblong, reflexed. Pet. Capsules five, aggregate, membranous, globose, separating at the mide, each attached upwards to a long, linear, flat, pointed, rigid, smooth awn, at length elastically recurved, adhering by its point to the summit of the style. Seed solitary, lateral, roundish, their surface smooth or dotted.

Eff. Ch. Calyx of five leaves. Petals five. Nectariferous glands five. Fruit beaked, of five aggregate capsules, each tipped with a long, recurved, naked aven.

Obf. This genus, as above defined, contains only the Geraniana columna of Linnaeus, or what are commonly called European Geraniaus, or Crane's-bills, bearing but one or two flowers on a stalk. (See Eroditum.) Thus it is adopted by Willkdnov, who has 39 species, 13 of which are natives of Britain. They are tlerably naturally distributed into three fections.

* Flower-flalks single-flowered; 4 species.

G. singuineum, Engli. Bot. t. 272, a hardy 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 Pl. Brit. 739. A variety found on the Laneshire coast, of humble depreived growth, with white red-veined petals, is frequent in gardens.

G. fllirium, Jacq. Hort. Vind. v. 1. t. 19, an inconsistent species, is, we believe, commonly single-flowered.

** Flower-flalks two-flowered. Root perennial, 24 species. Most of the Crane's-bills usually cultivated for ornamen are of this division, as

G. anonyunfolium of L'Héritier. Curt. Mag. t. 266. This shovly species, discovered by Mr. Maffon in Madiera, was, as Mr. Curtis records, long known in our gardens by the name hvegetum, admirably expressive of its smoothness, and the French botanist changed it for the work. We could have
no redress, as the original name had not been printed. It is a hardy greenhouse plant, throwing out, from its short knotty stem, a profusion of spreading, long-stalked, hissing, palmate, pinnatifid leaves, and many spreading, leafy branches, forked upwards. The flowers are large, of a fine crimson, broader than a half-crown.

G. macrorhizum, Linn. Sp. Pl. 953. Jacq. Hort. Rar. t. 154. 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 herbaceous. The plant is of humble growth, with a short knotty stem, like the leaf. Leaves soft and downy.

G. phaeum, Linn. Sp. Pl. 953. Engl. Bot. t. 132; and G. fusca, Linn. Mant. 97, two species very nearly akin, are remarkable for the dark brown colour of their flowers; as G. reflexum, ibid. 257. Cavan Dift. t. 81. f. 1, is for its reflexed petals, and G. lividum, I. Hort. 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, serrated petals, of a pale livid dove-colour. These four leaves are often seen in gardens about London.

G. nodosum, Linn. Sp. Pl. 953. Engl. Bot. t. 1091, is the most rare British species, and scarcely found elsewhere but on the mountains of Providence and Dauphinny, in shady places.

G. fliratianum, Linn. Sp. Pl. 953. Curt. Mag. t. 551, a native of Italy, very hardy with us, is generally admired for its delicately pencilled blossoms.

G. angustissimum, 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. britannicum, Linn. Sp. Pl. 954. Engl. Bot. t. 404, a very handsome blue-flowered species, common in pastures in the north, is extremely remarkable, and almost singular in this natural order, for having sometimes double flowers, in which state it was found near Athol house, Scotland, by lady Charlotte Murray in 1793. It is often seen with white petals.

G. virginicum, Linn. Sp. Pl. 954. Curt. Mag. t. 504, a native of Mount Baldus, was introduced into England by the indefatigable and intelligent Mr. Lod lige, whose zeal and liberality as a cultivator are above all praise. Its leaves are beautifully flat, the plant dwarf, but the flowers peculiarly large, bluish-coloured, veined with red.

G. pyrenicum, Linn. Mant. 97. Sm. Fl. Brit. 735. Engl. Bot. t. 405. Curt. Lond. fac. 5, t. 42, 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. boveocum, Linn. Sp. Pl. 955. placed first in this section, well drawn in Dilleniis Hort. Eth. t. 133. f. 169, is remarkable for its very black hairy seed-vessels, and villos leaves.

G. molle, Engl. Bot. t. 778, ought to follow immediately; with dijeficum, t. 7533; rotundifolium, t. 157; and pajritis, t. 385. These four, long confounded, and inaccurately understood by any botanist, are beautifully distinguished, in every degree of luxuriance, by their capsules, which are corrugated and naked in the first, more slightly corrugated, but hairy, with reticulated seeds, in the second; carinated, even and hairy, with reticulated seeds, in the third, with much more entire leaves; even and hairy, with smooth seeds, in the last, whole hairs on the part in question are; moreover, close-packed, 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. 2. t. 148, where it is mistaken for a new plant, and called 

Germania, 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. fritatum); the Siberian crane's-bill (G. leucanthes); the bloody crane's-bill (G. fanguineum); and the long-rooted crane's-bill (G. macrorhizum); but there are other sorts that may be cultivated with propriety.

The fifth species has several varieties, with short spreading stems 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 lifting the seeds or parting 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 shady 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 similar earth, at the distance of five or six inches in the latter case; but where this cannot be done, they may be transplanted elsewhere 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 parting of the roots is practicable, care should be taken not to divide them too much; planting them out in the early part of the autumn, either in pots or other vessels, 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, besides that of their being 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 houses in mixture with those of other sorts.

**GERANOS, Figae, in Antiquity, a remarkable dance performed in the festival called Dilia.**

**GERANZAGO, in Geography, a town of Italy; nine miles E.N.E. of Pavia.**

**GERAR, or Geras, or Gerasum, in Scripture Geography, a city of the Philistines, S. of Judah. The Abimelechs 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 Bezon, about seven miles S.W. of Debir, and six E. of Beeriheba. It afterwards belonged to the tribe of Simeon. Gerar extended far into Arabia Petraea, being 25 miles from Edathorpe, beyond Daram, the south of Gudah. Motes lays, that it lay between Kedesh and Shur; and he mentions the Jordan or valley of Gerar. (Gen. xxvi. 26.) Sozomen speaks of a little town, called Gera, 50 stadia from Phalasum.**
Gerard is confounded with Beerheba, Ashkelon, Alluah, and Arad.

GERARD, Herr, in Botany. See Aegopodium.

Gerard, in Biography, who flourished about the end of the eleventh, and commencement of the twelfth centuries, founder and first grand-master of the order of St. John of Jerusalem, was a native of the isle of Marigues, on the coast of Provence. While Jerusalem was in the hands of the Saracens, some Neapolitan merchants obtained permission from the sultan of Egypt and Syria, in the year 1059, 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 abbot built, with the wealth poured in by the rich devotees, an hospital for the reception of the poorer claths, and with proper accommodation for the aged and the sick. The management of this he gave to Gerard. A part of the building was separated for a chapel dedicated to St. John, because it was said that Zacharias, the father of St. John, had lived on the spot where it was built. Gerard, after the conquest of Jerusalem, by Godfrey of Bouillon, projected the foundation of a new religious order, in which the ecclesiastical and military character should be blended. He began about the year 1170, to carry his design into execution, when numbers of persons associated with him under the denomination of the Hospitallers 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 Piacul II. Gerard was the first grand-master, and Fitch was the commencement of that order which has been so frequently and so long celebrated in history: the members of it were first demoted knights of Rhodes, and afterwards knights of Malta. Morei.

Gerard, John, a learned German Lutheran divine, was born at Jenae in the year 1551, 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 Jenae. 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 Jenae. 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;" "Dissertationum theologiarum Fideiculis;" "De Ecclesiae Copiae Ortu, Progrefu, et Doctrina."

Gerard, Alexander, was born at Garioch, in the county of Aberdeenshire in the year 1552; 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 mathematices, 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 1570 was chosen fellow to the University of Edinburgh. Dr. Gerard was ordained a 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 office 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 1775. Dr. Gerard's attainments were full rather than brilliant, the effect of close and almost incessant study, and a fine judgment. He had improved his memory to such a degree, that he could, in little more than an hour, get by heart a sermon of ordinary length. He was author of "An Essay on the Theory of the World" published in 1750, and which obtained for him the prize of a gold medal, from the Society of Edinburgh. This work was afterwards much enlarged and reprinted in 1780. His "Dissertations on the Genius and evidences of Christianity," published in 1766, are well known and highly appreciated; so also are his "Essay on Genius," and his sermons in two volumes. In the year 1799 his sons gave the world a posthumous work of much merit, which had been left among the papers of his father, entitled "The Pastor's Care," which made a part of his theological course of lectures. As a clergyman the conduct of Dr. Gerard was marked with prudence, exemplary manners, and the most punctual and diligent discharge of his ministerial duties; his sermons were simple and plain, adapted to the common chafs 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 practically useful, rather than to unmeaning speculations, he enjoined 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 1547. He practised surgery in London, and rose to eminence in that profession. Mr. Granger says "he was very many years retained as chief gardener to lord Burleigh, who was himself a great lover of plants, and had the best collection..."
Gerarde lived in Holborn, and had there a large botanical garden of his own, of which he published a catalogue in 1556 and again in 1599. Of this work scarcely an impression is known to exist, except one in the British Museum, which proved of great use in preparing the Hortus Kesaris of Mr. Atman, as serving to ascertain the time when many old plants were first cultivated. Holborn was then in the outskirts of the town on that side. The reader of English herbal history will recollect that the hypocritical Richard Hill, asked the bishop of Ely to fend for "some of the good strawberries which he heard the bishop had in his garden in Holborn," by way of shewing himself in good humour at the council, while, in fact, he was in fact meditating the future removal of Lord Harrowden's catalogue. The catalogue of Gerarde's contains, according to Dr. Pulteney, 1333 species, or at least supposed such, though many doubters were varieties, and there is an attestation of Lobel falsified, ascertaining his having seen nearly all of them growing and flowering. This was one of the earliest botanical gardens in Europe.

The great work of our author is his Herbal, or General History of Plants, printed in folio in 1597, by John Norton, who procured the wooden cuts from Frankfurt, originally done for the German herbal of Tabernaemontanus. The basis of the text was the work of Dodonaeus entitled Pompates, for which also we believe the same cuts had been used; see Donoxenex. Lobel affirms that a translation of the Pompates had been made by a Dr. Priefft, at the expense of Mr. Norton, but the translator dying soon after, the manuscript was used by Gerarde, indeed without acknowledgment. The intelligent reader of the Herbal will observe that most of the remarks relative to the places in which certain plants are found, their common nanes, &c., belong to the original work, and refer to the county in which Dodonaeus wrote, not to England. Gerarde is also accused of having been no Latin scholar, and of having made many mistakes in the additional matter which he translated from the works of Clusius, Lobel, &c. He also certainly misapplied many of the cuts. Notwithstanding such faults, Gerarde had the great merit of a practical knowledge of plants, with unbounded zeal, and indefatigable perseverance. Dr. Pulteney judiciously observes that notwithstanding his manifest inferiority to Lobel in point of learning, it must yet be owned that Gerarde contributed greatly to bring forward the knowledge of plants in England. His connection with the great, and his situation in London, favoured an extensive correspondence, both with foreigners and his own countrymen; and his success in procuring new exotics, as well as scarce indigenous plants, was equal to his diligence and affability. In fact, we owe to Gerarde and his friends the discovery of many new English plants, and his name will be remembered by botanists with esteem, even after the utility of his Herbal is superseded." Among the persons to whom we are indebted for the communication of exotic plants and seeds, are recorded Sir Walter Raleigh, Edward Lord Zouch, and Lord Hunsdon, with many of the elevated rank.

A second edition of Gerarde's Herbal was published by Dr. Thomas Johnson in 1636, which has ever since been a very popular book, and indeed, as Haller remarks, Gerarde was the classical author of the English, almost to the time of Ray. Johnson, like many other editors, enlarged his author with great freedom, and undoubtedly made many essential corrections. He has prefixed a list of his additions, which are very numerous, and a learned historical preface. He was a man of far more learning than Gerarde, but by no means so good a botanist. Among the most valuable of his additions are the communications of Mr. John Goodyer of Maple-Durham, Hampshire, a man of singular penetration and accuracy in practical botany. Johnson added many excellent figures, either of new plants, or in the place of such as were badly executed in the first edition. Among the latter is Gratiosa lauenfa, which Haller complains he could make nothing of. It proved to be Scutellaria minor, and is well reprinted in Johnson's edition, p. 581.

Mr. Granger, in his Biographical History of England, ed. 4. v. 1. 275, mentions only two engraved portraits of Gerarde.

"John Gerard;" engraved by William Rogers, for the first edition of his Herbal.

Ditto engraved by Paine, for Johnson's edition of the same book.

The latter, dated 1636, is a small copy of the former. These is a spring of the potato plant in the left hand.

The writer of the present article is pleased of the copper-plate itself, very much worn, of an octavo portrait of Gerarde, without age or date, holding a spring of Cyphus, with his arms and the Italian motto, "O genti, bene!" In one corner below is a branch of Jasmine, in the other the Bugloe. The name of the engraver seems to be Hall.


Gen. Ch. Calyx five-cleft: Corolla two-lipped; the lower lip in three deep emarginate lobes, the middlemost deeply divided. Capule of two cells, opening at the base.

This
pany 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 ho 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 facility 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. Gerbillon 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-general of all the missionaries sent from France. He died at Pekin in the year 1727, leaving behind him curious accounts of his eight journeys into Tartary, which have been printed in Du Halde’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. Moreri.

GERBOA, in Zoology. See Dirus.

GERBSTADT, in Geography, a town of Germany, in the county of Mansfeld; 30 miles S.W. of Dessel. N. lat. 51° 40'. E. long. 11° 47'.

GERDAU, a river of Luneberg, which runs into the elmenau, at Oldenbrandt.

GERDAVEN, a town of Prussia, in the province of Natangen, situated on the Omet, near a considerable lake, which is called the “Calendur of Gerdaiven,” from its prognosticating the weather; 30 miles S.E. of Königsberg. N. lat. 54° 16'. E. long. 21° 27'.

GERDEN, a town of Germany, in the bishopric of Paderborn; 14 miles E. of Paderborn.

GERDES, DANIEL, in Biography, was born at Bremen in 1608, where his father was engaged in a commercial life. Great care was taken of the education of Daniel, who made a 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 uen-tione quae Fides ex omnis doclar.” 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. Biog.

GERDIN, in Geography, a town of Russia, in the government of Perm, situated on the Wolga; 152 miles N. of Perm. N. lat. 59° 40'. E. long. 56° 14'.

GERDOSA, a mountain of Africa; 80 miles E. of Angus.

GEREKEK, a town of Hindooistan, in Bahar; 12 miles S. of Bahar.

GEREM, a town of Grand Bavaria; 15 miles S.S.W. of Badakshan.

GEREMISCHANGKAIA, a town of Russia, in the government of Upha; 36 miles W. N.W. of Bagul-ná.

GEREN, a town of Prussia, in Pomerelia, on the Vlunla; 9 miles W.S.W. of Marienburg.

GERENLIO, or GERMANNUS, in Ancient Geography, a town of Italy.—Alfo, a town of the Peloponnesus, in Laconia. Ptolomy.—Alfo, a town of Meffinia, on an eminence, S.W. of Aba-gonia. Pausanias says that this town was the same with the “Meta” of Homer. It was consecrated to Machaon, an ingenious physician, slain by Eryphlius, whose bones were collected by Nestor, and deposited at Rhodon, near this town. It had a temple dedicated to Machaon. East of it was a mountain called “Calathion,” on which was a temple consecrated to Calathica, with a grotto, having a street entrance, and containing in its interior many curiosities.

GERENNA, or JERENNA, in Geography, a town of Spain, in the province of Seville, surrounded by large Doros, supposed to have been the effect of an earthquake; 12 miles N.N.W. of Seville.

GERENSCHANSKOLI, a forterey of Russian Siberia, in the government of Kolivan; 240 miles S.S.W. of Kolivan. N. lat. 50° 15'. E. long. 79° 14'.

GERESHEIM, a town of the duchy of Berg; 5 miles E. of Duffeldorf.

GERE SOL, in Mufi, one of the chiefs.

GERESPA, in Ancient Geography, a town of Asia, in the interior of Media, sometimes called Geripa, and Geripa.

GERESTADT, in Geography, a town of Norway, in the bishopric of Aggerhus; 32 miles S.W. of Tonberg.

GERESTO, a town of the island of Negropan; 16 miles S. of Carito.

GEREUTH, a town of the principality of Wurzburg; 5 miles N. of Ebers.

GERFALCON, GERFALCON, or Gerfalcon, (for Falco). This is naturally a very bold, wild and fierce bird, and is therefore very difficult to be reclaimed; but when that is done it proves one of the very bold kinds, and will fly at almost any thing. The beak of the gersalcon is always blue, and the claws are remarkably long and strong.

In going up to the gate, as the sportmen express it, these birds do not hold the same fort of course that others do, but immediately climb up upon the train on flight 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 fort of hawk is to be fed and rewarded like the others. It is of a very fly and crafty nature, and is so flightful, 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 fast. As to the reclaiming this fort of hawk, it is only to be done by gentlefins and kindnes; and when the has been taught to be turned loose, she is not to be taught to come to the pets of hens or other fowl. But the must never be suffered to taste any living flesh, for that will be apt to draw away her love from the hand and voice. Whenever she eats, 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 hurry 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 Parchena.

GERGARALVA, a town of Tranilvania; 16 miles W. N.W. of Hermenfadt.

GERESA. See Gersasa.
GER

GERSENESES, or Gersemites, 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 Geography.]

GERGETHI, or Gergheta, a town situated in the Troad, E. of Rhetium, Ophrynum, and Dardanus, in the vicinity of the site of Troy or Ilium, 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, seeming to be the same with Gergetha.

GERGIS, the name given by Steph. Byz. to the Gergetha of Strabo.

GERGOS, in *Geography*, a town of Africa; 30 miles W. of Tripoli.

GERGOVIA, in *Ancient Geography*, a strongly fortified place of Gaul, belonging to the Arvernii. According to Caesar (I. vii. 36.) it was situated on a very high mountain, 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.

GERHARDSBRON, in *Geography*, a town of Germany, in the principality of Anspach; 28 miles W. of Anspach. N. lat. 49° 17'. E. long. 10°.—Also, a town of Wurttemberg; 28 miles E. of Haibron.

GERINES, a sea-port of the island of Cyprus, anciently called "Cerynia." 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 Caramania, whether it exports rice and coffee brought from Egypt, and whence it brings back florax, and a great number of passengers. Gerines is the residence of an Aga and Cadi: 16 miles N.N.W. of Nicofia.

GERINGSWALDA, 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 Aphonin.

GERISA, in *Ancient Geography*, a town of Africa Propr. situated between the two Syrtis. Potomny.

GERISAU. See GERISA.

GERKOW, Jorkow, or Barka, a town of Bohemia, in the circle of Saaz; 22 miles N. E. of Saaz.

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 distinguished for his diligence at the university of 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 an acquaintance with the most eminent men in the latter communion. Upon his return to Tubingen he obtained other preferment, and engaged in the duties of his profession with so much zeal and fidelity, as to injure his health. He died in 1612 in the 66th year of his age. He was author of "An Epitome of Ecclesiastical History," of "A Journal of the embassy sent to the Porte by the emperors Maximilian II. and Rudolf II." abounding in curious and interesting particulars, historical, ecclesiastical, and theological: and numerous theological "Differtations," &c. More.

GERLATZKOI, in *Geography*, a fortress of Russia, on the E. side of the Iritich, in the government of Kolyvan; 212 miles W. of Kolyvan. N. lat. 54° 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 of strong barks, tolerably constructed; without decks, drawing little water; and, according to their size, having two or three masts with very large latine sails, the yards of which are fixed to the heads of the masts, 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 furl 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 some shelter, this coasting trade is not free from danger, especially at the mouth of the western branch of the Nile, formerly called the "Bolhitic," now the "branch of Rosetta;" where is a bar formed by the sand, upon which the waves, driven by the wind from the offing, and opposed by the stream of the river, break with great fury. A small island, dividing the entrance of this branch, leaves on each hand a narrow passage, called in the language of the country "Boghas," 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 the agitation of the sea. A pilot, "Reis," or master of the "Boghas," is continually employed in fouding this changeable passage, and indicating it to the "germs." In spite of all these precautions, they often get on shore; and, being soon overwhelmed with water and sand, perish with their crews and cargoes.

GERMA, or GERSE, in *Ancient Geography*, a town of Asia, upon the Hellespont; which, according to Ptolemy, was a colony founded by the Gauls, named Tolotiboians, 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 Matheque raidonnée," in which there were elegant passages, singular movements, and amusing canons. 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 dissemble, "fut figilto confusionis," that he was originally a musician by profession; but that by his obvious fortune he had realized an independent fortune; but this, like newspaper reports, merita confirmation.

GERMAIN, ST. in *Geography*. See ST. GERMAIN.

GERMAIN, ST. A. town of France, in the department of the Creuse, 15 miles N. W. of Guzeret.—Also, a town of France, in the department of the Aube; three miles S. W. of Troyes.
GERMany, in Matters of Genealogy, signifies whole, entire, or own.

"German, quasi cadem filipre genitii." Feil. Hence,

German, Brother, denotes a brother both by the father's and mother's side, in contradistinction to utterine brothers, &c. who are only so by the mother's side.

German, Confrat., 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 confins german before the time of the emperor Claudius, when they were very frequent.

Theodorus prohibited them under very severe penalties, even fine and proscription. See Consanguinity.

German acacias, bezoar, bible, black, coins, compafaei, emperor, empire, flute, language, measure, monics. See the several fabulatives.

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 a 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 miliefs 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 reserved for the artists of Germany or Italy, and most probably the former, first to perceive that ink might be delivered, and impressions thus multiplied to an indefinite amount, both from the incisions and surfaces, of engraved plates of metal, and blocks of wood.

The precise time of the discovery has not been ascertained. The baron Heinemckin, who had excellent opportunities of acquiring information, and pursued his enquiries with zeal and accuracy, has clearly shown 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 1376. Not long afterward, the same art that had been subservient to amusement, was employed to gratify and disseminate superstition, and extremely rude outlines of saints and legendary tales, which were cut on tablets of wood, and were printed in the cities of Mentz, Strasburgh, and Haerlen, toward the close of the fourteenth, and beginning of the fifteenth centuries, are not uncommon in the port-folios and bibliographical collections of the curious.

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 Heinemckin in the library of a convent at Basel, near Memmingen: its subject is the legendary tale of St. Christopher carrying the infant Jesus across the sea; it bears the date of 1423, and is inscribed "Christioper faciunt, quia haec eis fuerit usus: nulla nomen benedicat vir."

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 it
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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 impressed 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 simply outlines, and in others, which were produced somewhat later, shadowing, 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 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 juicy 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 falsified or intercepted much of the pleasure which the engravers' art is capable of imparting; and that the philosophy of degrading 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 novel 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 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 seals 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 impressions 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 drolling speeches of criminals at present) grossly addressed itself to the lower classes of the community, it was regarded as of very little consequence; and though Keffer, Guttenburg, and Faust, 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 consequences gradually resulting from the discovery, that have made us attach a degree of credit to the name, and entertain an unmerited respect for the supposed researches, of the discovery 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 fngulate 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 reception 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 Faust 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 fame engraving which adorned the flicks and pateras of the remote ages, with the addition of paper, might have spread the rays of Greek and Etrurian intelligence over the world of antiquity. The process of printing is indeed so simple in itself, and was so nearly obvious in the state 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 invened 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 printers 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 pur chase manuscript copies of the Old and New Testaments, beside the apocryphal visions of St. John the Divine, which has been already mentioned, a small folio volume, entitled "Historia Veteris et Novi Testamenti," (commonly known by the name of "The Poor Man's Bible," and published about this time, or soon after. In the same manner as the former, each leaf, printed from a single engraved block of wood, consisted 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 "Histo ria 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 engraving book which bears date at all, is called "The Chiromancy of Doctor Hartlieb." It consists of twenty-four small folio leaves, printed on both sides.
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At the beginning of this curious book," says Strutt, "is a large vignette, representing Dr. Hartleib 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 "Lide generale d'une Collection complete d'etampes," the appearance of being so ancient as those in the Apocalypse, or Poor Man's Bible. This curious compilation is dated 1448, and the name of Jorg Schaeff, 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 earlie 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. Johnl Schnitzer executed the geographical charts for the edition of Ptolemy, printed at Ulm in 1486. His map of the world is ornamented with ten rude heads, which are intended to represent the winds, and is inscribed, "Inlucum per Johanne Schnitzer de Arnhem." Sandrait indeed mentions and copies a print, which he believes to bear the date of 1455, and which is marked with a cypher, such as the reader will find in our first plate of the monograms, &c., of the German school of engravers. As this cypher is composed of the initials of Hans Sporer, it may possibly be from his graver; yet neither Sandrait, nor the author of "The little chronological Series of Engravers," which was printed at Cambridge, ascribe it to him; the latter afferts in his Preface, that the two lives in the date, or what Sandrait supposes to be such, are intended for fevens; 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 caring for an elderly man while the steals his purse; a subject which has often been 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 fluff manner which characterized the early German masters obliterates much of their merit. Besides which they are incorrectly drawn; the extremities of the figures, in particular, are very defective. Schauflein usually marked his prints with an H and an S, or an I and an S joined together, without the ped; "The Life of Christ," a set of middling-sized upright prints, in quarto; another set of "The Life of Christ," in an octavo volume, consisting of 37 prints, entitled "Vite et Passo Jefu Chritii," &c. published at Francefort by Christiaen Egonius, A. D. 1537. To these are added, "Hillorie Evangelii," containing the miracles, parables, &c. of Christ, in thirty-six prints, the same size as the above, and printed on both fides. These are marked with the I and S joined together upon the peol.

This artif sunk 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 converting," of which this author treats, may be the work of a third engraver of the same name. The date of the latter is 1551, and Strutt has previously recorded of the third Schauflein, that he has been, by himself a print of two men fighting, cut on wood, in a coarse but spirited manner, and a very fine mannerly etching in the style of a painter, representing a large company at an entertainment in a garden, of 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 Schadel, 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 consist, for the most part, of figures of various kinds, and landscapes which, though professedly views of certain cities, towns, &c. bear so 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 badly delineated, though that meagre fifteenth 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 Walsh, 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. Walsh 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 Walsh. 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 batter down the argument of Strutt and Huber, since if a man of genius flutters 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 surmounted by a small o, and these prints, I verily believe, are the productions of his graver."
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 resting 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 Comes Picata- rienus.” 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 Waghemut, that he was the tutor of Albert Durer, a name so 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 Formelbilder and Briefbilder 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 Walsh 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 delights of this kind are sadly confounded. 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, confounding of the initial letter of his surname and a kind of lozenge crofs, may be seen 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 crofs only, which have the appearance of being more ancient than those which are marked with the W and crofs.

Of the former kind are, “a hairy, wild, Man fighting with a Bear,” and “a Woman fented, carrelling a Unicorn,” both small, and of the upright form.

Of the latter kind (marked with the W and crofs,) a Gothic ornament for a crozier, a large upright; “The inside of a Gothic Edifice,” a middle-sized circular plate, “A Ship striking against a Rock,” with the inscription, “Herdz” 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 stem of the lineage of Christ from David to Joseph, represented (as usual) by half figures. This last is a large upright print.

Martin Schöen, or Schön, or Schöengauer, called by the foreign writers on art, Le Beau Martin, or Hübfe Martin, and mistakenly called by Vafani Martin of Antwerp, was born at Cœmbach, a small city in the circle of Franconia, in the year 1426. He was educated a goldsmith, and a certain Lüprecht Ruit, and Francis Van Stofs, or Stolhirs, have been mentioned as his tutors. At the age of forty, and probably before, he distinguished himself by his 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, some of 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 manseled the taste of Germany, his admirers may solace themselves by doubting whether the unfilled powers of any individual whatever would have been found adequate to so difficult an occasion. The tyranny of established custom is probably not less firm and unyielding in the arts of design than in those of education.

How the stiff and meagre manner,—the angular draperies and emaciated forms which characterize the early productions of the Germans, came to prevail among the Gothic and Celtic nations, from whom they derived them, is a curious, and perhaps not an unimportant, question. By comparing the early efforts in art of 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 transmision to the intellectual retina, and in every country continue to be so refracted, until, as the fun of science slowly ascends, the morning dentity of the mental medium is gradually rarefied; it is not less observable, nor a less curious fact, that a similar haggard lankness 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, Perfa, 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 dispraised either Schöen or Durer, for not having done, what no artift 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 gloomy exhalation 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 using with considerable success the materials by which it was surrounded; and it may be regarded as fortunate for
his claims, that in the infancy of his St. Anthony he has
adopted a subject that in its nature fet him free, or nearly so,
from the Gothic bondage with which, on other occasions,
his genius was shackled: he has been the first boldly to
venture into the regions of Chimera, and by the potency
of his art has compelled thence the demons that Callot and
Teniers were afterward solicitous to invoke and proud to
embody; while the expression of undisturbed faith and pious
reignation in the countenance of the holy man whom they
are hurrying into the air, shews that he saw and copied that
portion of Nature which the devil vouchsafe to reveal to him,
with clear definition, and delicate, though determined, hand. If
his demons are more fantastic and left terrible than modern
art would deem it proper to introduce, we should recollect
that the age of Schöen was that of Ariosto, and that two
centuries slipped between the grotesque mollons 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 counte-
enance at an early period, (or indeed at any period,) than of
the rest of the figure, because it is the kind of study and observa-
tion in which men are most interested. Accordingly, Schöen's
heads are in general by far the best parts of his performances.
The few 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 crofs, as it appears in the
good impressions, have rarely been surpassed; and several
other heads in this extensive composition posses a propor-
tional share of excellence.

In this, as well as in several other of Schöen's prints, may
be traced a latent feeling existing in the mind of their
author, that the engraver's art might be rendered subservient
to the expression of the various textures of fabrics. Nay
more; this elementary principle strongiy discovers itself in
the manner in which he has treated the grain of the wooden
crofs; in the various modes he has invented of describing the
different materials of draves in which the figures are habited,
and in the facility of the ground; perhaps the latter is as
much the result of the necessary operation of the unedu-
cated graver, as of study. Yet, is it in such full concord with the
barrenness of the scene, and the barbarism of the subject,
as to be not unworthy of favourable notice; while the
whole together seems to shew that a sentiment has subsisted
from the very commencement of engraving, that it was
susceptible of this particular merit, and which may therefor
be fairly presumed to be not founded in the fallacious
reinements 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 Schöen affixed to his works may
be seen in our first plate of the monograms, &c. of the German
school of engravers. Heinmeken has enumerated an hundred
and fifty of his engravings, molt of which are much and de-
servedly fought alter by connoisseurs. We shall begin our
select hit with the mention of those of which the subjects
are taken from faced history.

A Nativity, where the Virgin Mary is in the act of ador-
ning the infant Saviour, who is laying on a straw pallet; behind
the Virgin appears a bull and an afe; and in the distance
St. Joseph. Three angels appear in the air, holding a
scroll.

Another Nativity, where Joseph is seen in profile, holding a
lamp. The bull and afe 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 in dulcetly above.

On the same plate of copper, which is still kept as a cu-
tiosity, and may be seen in the chapel of the hospital at Col-
mor, 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 skillfully
executed, and is of a small folio size.

"The Flight into Egypt," in which angels are represented
after St. Joseph to gather dates, and lizards are intro-
duced 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 Virginis," and "The
foolish Virginis," 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 quartos 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, soldiers are scourging him;
in the fifth, he is crowned with thorns; in the sixth, Pilate
is washing his hands; in the seventh, he is exhibited to the
multitude; in the eighth, bearing the crofs; the ninth is the
crucifixion; the tenth the holy Euphrasis; the eleventh the
defence into hell, and the twelfth the Resurrection.

A large folio of "Christ bearing his Crofs," one of the
most celebrated of the engravings of Schöen, and on
which we have commented above.

A Crucifixion, also in folio, and which has been copied by
Israel van Mechelin. The Virgin Mary and St. John are
in this print represented at the foot of the crofs, and angels
in great affection: "The last Judgment;" a set of twelve
middle-sized uprights, of which the subjects are taken from
the life of the Virgin; "The Death of the Virgin,"
also, which has also been copied by Van Mechelin and
other contemporary artists, and is a composition of con-
derable merit, and one of the most carefully finished en-
gravings of the matter; "St. Anthony hurrying into the
Air by Dammon," a very capital work, of which we have
already spoken, an upright folio, but not very large. A set
of the apostles, very small.

Of miscellaneous subjects, Schöen 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, conflating of armorial bearings with their appropriate supporters, &c. cloathing with an
ecutcheon, bearing the cypher of the artifal himself, sup-
ported by a female; and "The Battle against the Saracens,"
in which St. James appears on the part of the Christophians;
a large folio plate, prefumed to have been the last of Schöen's
engravings, from the circumstance of certain dilater figures
toward the left hand corner being left in an unfinished
plate.

Bartholomew Schöen is said, by professor Chrilt, to have
been the brother of Martin, but of the dates of his birth
and death we find no account. His apparently very an-
cient engravings are known by his initials, having between
them a mark of separation exactly resembling that which
separates the initials of Martin Schöen, which confirms the
probability of their having been the same person.

The engravings of Bartholomew bear that fort of resem-
blance 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.

His
His original works consist chiefly of grotesque figures, of which some are by no means destitute of humour. It may suffice 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 lade 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 best from the life of Christ, the large folio of Christ bearing the cross, and various other 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, shines forth on the world, a swarm of busy flatterers round his glory are kindled into exultation, buss in his rays, and think to share his fame. Such was Bartholomew Schöen, when compared with reference to his brother; such probably were Paul and George Schöen, 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 small portion of our notice.

Of talents far inferior to those of Martin Schöen, yet engravers to whose works the virtuosi are by no means indifferent, were the Israel von Mechelns, father and son, whom Strutt has mistakenly inclined to identify, as having been one and the same individual. Both were natives of Mecheln or Mekenin, a village near Bocholt, in the bishopric of Munster, in Westphalia.

The elder Israel von Mecheln (or Mekenin) was born in the year 1424, and, like Schöen, 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 1525. It has been conjectured, that he studied under Martin Schöen, from the number he has copied of that master’s works, but this seems very insufficient evidence of the fact. It rather seems to show that the baron’s inventions corresponded with the dryness and infidelity of his style as an engraver.

The works of the Von Mechelns (if the father engraved) are numerous. That he did engrave, is inferred by the baron Heinrich from 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, crofies, 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 see no reason for dividing the works which pass under this name, nor can he find any other difference in the prints that might reasonably be expected in the works of an individual artist, who performed so many; 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 tenor Mecheln, an elderly nun with a long beard, his head dressed with a turban. The plate is in quarto, and bears the inscription "Israel von Mecheln, Goldschmidt." Ditto of Mechelin, junior, and his wife, inscribed " Figuare faciatur in Maria, et in Animam, I. V. M." in quo.


These are among the prints which Heinrich supposes to be the work of Mechelin 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 as 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 also is a folio plate, twelve inches in length, and marked Israel V. M. At one end is seen the decollation 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 Israel’s engraved several, the chief of which may be known from each other by the following peculiarities. In one, the Virgin Mary, habituated in a long robe, is fitting with the infant Christ, while beyond an enclofure appears St. Joseph reposeing. Toward the bottom, at the right hand corner, is a small griffon, from which it has obtained the name of the Virgin of the Grifhopper. It is in quarto, and inscribed Israel V. M. (This plate has been copied, with improvements, both by Albert Durer and Mark Antonio.) In another, the Virgin Mary, seated in a landscape, is about to kiss the infant Saviour; the Deity appears in the clouds above; and St. Joseph sleeping. (This is a middle-sized upright, and is partly finished by means of etchings, which are apparently made with the point of the engraver, somewhat in the manner of Rembrandt.) In another, which is dated 1485, the Virgin and Child are surrounded by four angels. This is also a middle-sized upright.

In other sacred subjects, we shall mention "The Annunciation," in quo., where an angel appears holding a scroll, on which is the motto "Ave, Gra.;" and the Virgin is kneeling before a praying deff, 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 Crucifix, 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 Schöen, and the large folio 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 wound 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 lifted, 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 quo., inscribed I. V. M. Schöen’s "St. Anthony tormented by Demons," and "St. Jerome," in which the saint appears seated in a room and painting a scroll.
On the right hand corner is the lion's head. The latter has been copied by Lucas of Leyden, and in the opinion of Strutt is Israel'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 threading an Hour-glass," a design which, whoever was its original author, had previously been engraved by Sporer or Schaffelen, and has been subsequently copied by Albert Durer and several others.

Of the angular design consisting of three naked women, with a globe hanging above, which is inscribed 153, there is also an engraving by Israel.

A folio plate of "The Death of Lucretia;" a pair in quarto, of "A Woman finging, while a Man accompanies her on the Lute;" and "A Man playing the Organ, which a Woman blows the Bellows," both marked I. M.; Schöen's richly ornamented incunabula, and several plates of grotesque foliage and other goldsmiths' ornaments, are all that we shall mention of the two hundred and fifty engravings by the Izraels which are enumerated by Heinemarch. Neither of them appears to have had any settled monogram, but marked his engravings variously, as we have stated in the course of our life, sometimes adding to his name and residence the word "Goldschmit," and at others "Tzni Brockholdt," in the German character. The best of their works, as has been before intimated, are copies from the superior productions of Martin Schöen.

Matthew, or Martin Zagal, Zalinger, or Zinck, goldsmith and engraver, was born in the year 1430, 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 full worse: the mechanical part of his engraving, indeed, poisselles a certain degree of neatness, but is without the fainted ray of taste. It is proper, however, to observe, that from the decay of the art, or rather from the stiffness of Zagal's manner of engraving, his plates would not lend many good impressions; that many of the retouched prints, which are exceedingly bad, are abroad in the world, and it is also probable, that the author of the edition, in which he printed, 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. Zagal 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 muddling-sized upright, dated 1501. "A Holy Family," in which the Virgin Mary is receiving water from a fountain, in a cup, in the same date with the preceding. "The legendary Story of St. Christopher bringing the Infant Jesus across an Arm of the Sea," a small upright. "A Lover seated in a Landscape, entertaining his Mirthful," 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. "A Lover to War," ditto, and "Ariflotie the Philosopher," a subject often repeated, and called by some Socrates and Xantippa. The last is a very rare print, in 4to.

Albert Glockenton was a native of Nuremberg, born in the year 1432, 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 servile manner, by no means improving the drawing of his originals. He marked his engravings with a little 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 original of Martin Schöen, are "Christ bearing his Cross," and "Christ crucified," both rare and of the folio size; "The Death of the Virgin." The set 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 1466; 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 Raifonnée du Cabinet d'éblampe de Brumès."

Contemporary and co-equal with Zagal and Glockenton, was an engraver for whom Strutt claims a sort of doubtful existence, by the name of Wenceslaus of Olmuts, in Bohemia. He found a copy of Martin Schöen's "Death of the Virgin" in the Museo 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 1481. He adds, "there is no doubt of its being a copy from Schöen, because it bears the evident marks of a servile imitation. It is highly probable that Wenceslaus 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 Durer. 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 Olmuts Holten than Olmuts 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 heedless of Death." "The Lail 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 Mekenin.

An old Man leading a little Boy, with a Woman following carrying a Girl at her back; and "A Lover entertaining his Mirthful;" 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 Durer.
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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 list of his principal engravings, and to comment more particularly on those of which are, and deserve 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 1805 and 1806, 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 archetypes in nature, proceed, for the most part, too much upon the sublime 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 affiliate 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 men; and as neither the eye nor the mind can at once dilate with greatness and descend to little-ness, 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 distracted 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 alluded to reconcile us to the defects of this performance, if Albert Durer had named it his "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 oblique. Regarding the art as in its infancy, we may look at this engraving with the same kind of pleasure, and should at all the works of art of this period, with the same candid indulgence; which with Reynolds contemplated in "The Virgin and Child" by Van Eyck, in the cathedral church of Bruges the "artific," says Sir Joshua, "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 born;" yet we may perceive that he selected from nature with which he was acquainted; and though we do not behold the symmetry and superfluous grace of Greek beauty, we probably feel the felt and acknowledged beauty of Nuremberg. It will, it is believed, that the Paradise they must shortly quit, does not seem very desirable to inhabit; here is no gentle light, no luxuriants of vegetation, and no abundance of animal life. To use more of the words of Milton, nature is so far from wanting as in her prime,—so far from playing at will her virgin fancies, that she appears, in those of Shakespeare, "bald with dry antiquity;" yet if Raphael has violated this cardinal principle of propriety, by erecting a church, and houses two stories high in his Paradise, who shall throw the first stone at Albert Durer? The boles of his trees, though among the first, if not the very first that were ever engraved, 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 employed, and how comparatively ill calculated are the flack and stiff lines of the unfinished 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 render it unfit for the occasion. The prophet Idris has far more nobly expressed the primeval 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 shows the sneeze 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 without the ordinary routine of human life, with either allegory, or perhaps a sort of poetic armorial bearing. The crest is a winged helmet, richly ornamented, and beautifully executed; and though a skull, which one should think could not fail to be an awful monitor, is highly embossed on the shield, the female supporter, headlesse of her charge, headless of the moral leonin, and of the moral character she has to sustain, 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 splendidly attended to the finer enamel of its two remaining teeth. The head of the Savage, with its beard and wild rudiment of snaky tangled hair, has considerable and well-managed breadth of light and flanks, though its character is far less savage than should seem to belong to the rest of the figure: its expression is, doubtless, meant to be affumed and inflating. The countenance of the female has seldom been surpassed for that faceless mixture of character and expression that lends a willing ear to a delusive promise; and the heads and 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 been accustomed to see stiff, flarished, and complicated, is here relaxed into freedom and simplicity, and is so remarkable for its 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 inferior to that of his Melancholy, and some other of his infrequent 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 infinances occur of this style of superior simplicity in the drapery, and some of broad and captivating effects of light and shade. His Jesus Christ suffers greatly, or beams with God-like benevolence; his Magdalen and Madonnas are sometimes divinely pathetic; and many other of the heroes in these interesting and often grand compositions, are exquisitely finished miniatures, remarkable for that fort of accordance and conciseness 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 Frederic of Saxony, dated MDXXXIII. Albert, elector of Mayence, dated 1523. Bilibald Pirkheimer, dated 1524. Melanthon, dated 1525. These are all of 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 posse the fame internal evidence of correctness which distinguishes the best of his historical heads: in Kyl; they are laboured; but the labour is not ill-betted; and the chiaro-uro is frequently comprehensive and clear. His compositions from holy writ, and those 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 1524. 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 Madonna 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 Apple," where the Infant Christ, kneeling, is playing with a bird, and an apple is tied near the group. Another, known by the title of "The Virgin of the Pear," which is dated 1511, 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 Paffion," very rare, and dated from 1507 to 1512. "Christ Crucified, with the Holy Women 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 1517. "A Group of Angels bearing the Instruments of Crucifixion, &c." engraved on tin, or iron turned over, and dated 1516. "The grand Ecco 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 Chase," 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 cascade at some distance.

Albert Durer has been analogously 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 successful attention to minute excellence; the fame general air of incoherency rendered credible, and, if 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 these.

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 defile, and the engraving is far less elaborately finished than the former.

"A naked winged Woman standing on a small Globe suspended in the Clouds, holding in one Hand an elaborately wrought Cup, and in the other a Bridle," a folio print, known among dealers by the name of the Larger Fortune. According to Vahrn, 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 4to, called the Lesser Fortune. She holds a long derrick 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 exquisiter workmanship, dated 1514. "The Dream of M. Wolgemut," where he is represented asleep near a lying pen: the devil is behind with a large pair of bellows, and on the side Venus, with Cupid walking on fleeks. "The great Satan," 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 Sortes," four asked women in a room: a globe, with the letters O. G. H. is enamelled from above, and in an adjoining chamber appears the devil surrounded by flames: it is dated 1497. Baldiniuoli thinks it is the earliest of Durer's engravings. It is copied from Wolgemut, and is a rare print. "A Chaste on Horseback, and in complete Armour, pursued by Death on Horseback, (who is holding forth an Hour-Glass,) 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 Horrors," and by others, with more propriety, "The Worldly Man:" it is dated
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dated 1513, and the impressions which were taken before this date was inscribed, are much valued. "The Death’s Head," of which we have already given a particular description, in small folio, dated 1525. Another heraldic subject of the same dimensions, displaying a lion rampant on a field, and a helmet surmounted by a cock perching on its wings. "A Large Horse," behind which marches an armed man with boots, bearing a halbert, and another bore of more beautiful form, behind which marches another armed man with a halberd, giving a griffin on his helmet: both in 5to, and dated 1507. A dishevelled Scorsers, mounted on a Lie-Goat, and flying through the Air, with a Ditaff in her Right-Hand. "The Prodigal Son," a small upright folio, of which the impressions, before the date 1513 was added, are held in most esteem.

Under the article Etching 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 afterwards appeared his 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 "Albert Durer counterfeitt in seinem Alter des L.VI." without the engraver's cypher; another with his cypher; the emperor Maximilian I; a bust with numerous ornaments, inscribed "Imperator Caesar Divus Maximilhanus Pius Felix Augustus 1519." Ulrichs Varnbuler, a rare print, with the following inscription on a shield, "Albertus Durer Noricus redire quod notatur 1502.

From the numerous historical works which Durer performed in this manner, we select the following: A set of twelve folio prints, including the frontispiece, from the life and passion of Jesus Christ, inscribed "Pablo Domini, &c." dated 1510. A set of twenty-two small uprights, known by the name of the Smaller Passion, and inscribed, "Histoia Crucifitului Domini According to St. John, 1510." An "Ecce Homo," in folio, engraved in a bold and broad style, and with great freedom. The "Holy Trinity," surmounted by the Angic Hoff," 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 beautiful 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 is in the act of adoration. "The Rhinoceros," a rare print, in folio, with a German inscription, dated 1515.

In chiaroscuro (or chiaroreuso) printed from a succession of blocks, the following are ascribed to Albert Durer: "A Holy Family in a Landscape:" two angels are crowning the VirglinMary, 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 apostles of the emperor Maximilian, where, accompanied by the Virgin Mary and numerous saints, he is adoring the Saviour. (Of this piece HUBLER produced an impression in which very richly colored.) A pair, which are scarce, of "A Portrait in a Glove of Sepia," generally called the Siege of Vienna, dated 1527. A set of six ornamental designs for tapestry, of architectural subjects. The whole number of engravings by Albert Durer, and after his death, are listed to amount to 1214: but Marritte's collection amounted to no more than 420, which were sold at his death for 1830 livres. See the article Durer in the Catalogue Raifonnee of the Brueghel cabinet.

The triumphs of the emperors Maximilian, which, when palled together, form two very large and long prints of the frieze form, have been generally ascribed to Albert Durer, but the refearches of Mr. Dacre 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, of Kranach, was born at Cranach, in Weilplath, 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 lived 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 chiaro-fure. His fertility of invention far outran his judgment: led away by the livelihood of his fancy and talent for composition, he took such forms as were before him, following the stiff Gothic taste which prevailed in his country at the time, without attempting to improve it. His manner of drawing is rather dry and tawdry, 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.

Cranach sometimes marked his plates with the initial letters of his name: and sometimes with the cypher, but more frequently with the dragon holding a ring in his mouth, which will be found in our first plate of German marks and monograms. The dragon is the emblem of the elector of Saxony, to which, on some occasions, Cranach added the electoral fire.

The following will probably be found among 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 folio, and very rare. The two electors of Saxony, Frederic and Jean, the former of whom is holding a chaplet, in folio, dated 1510, and almost square. Christinian II. king of Denmark and Norway, surrounded by ornamental architecture, armorial bearings, &c. in large folio. A portrait of Martin Luther in the habit of a monk of St. Augustin, inscribed "Des Luter geblatt," in folio and dated 1525. The chief of his historical works are: "Adam and Eve after their Fall," (called by some the Penitence of St. Chry- folium) the scene is a defart, where a naked woman and child appear on the fore-ground, and in the back-ground a man is crawling, a folio plate, dated 1569. 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 Christ has somewhat better pretensions 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 latter denoting Wittenburgh; it
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is very rare and bad. A whimsical composition, of "Jesu Christ in the Clouds," surrounded by angels, and inspiring the editor of Saxon, a half length of whom appears below; a small print, almost square.

In chiarofuro, that is, on two blocks of wood, the one for the outline and darker shades, and the other for the demitints and lights, Cranach has engraved "St. Christopher carrying the Infant Christ over an Arm of the Sea," a folio print, dated 1507. "St. George and the Dragon," a large 4to. "St. John preaching in the Deserts," in folio, dated 1576. And, "A Naked Venus" (of judicious beauty) accompanied by Cupid, who is trying his bow, in folio.

The letter-prefs engravings of Cranach, commonly supposed to have been performed on wood, are as follow: But of Jean Frederic, elector of Saxony; ditto of Martin Luther in the costume of a monk of the order of St. Augustin, dated 1520; both in folio.

Whole length portraits of Martin Luther; Philip Melanthon; 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 in 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 1509. "The Annunciation." "St. John preaching in the Deserts," 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 Jesus Christ, inscribed on the title page "Paffio D. N. Jesu Chrifti veniullfimis imaginibus," &c. and dated 1509.; the set is highly esteemed among connoisseurs. A smaller set of twelve, of the Martyrdoms of the Apostles, in 4to, and which are held in still more request for rich composition and the 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, with how frequent infallibility, the Goths-german artists of the age of Cranach selected subjects that called for the introduction of beauty even of the highest kind, and drew out their virgin Miracles and Venemins in all the most graceful of their age and country. Paris visited by the three Goddesses on Mount Ida, is 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 tournament, 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 studied under Albert Durer, and some of his engravings are dated so early as 1510, 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 distinguished his work. Professor Chrift attributes to him some small spirited wooden cuts which are made for the ancient editions of the works of Geyer 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 Maximilian I. on Horseback;" of which design there is a dupli- cate engraving in clare obscure, which bears the name of Joht de Nagker, 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 Nagker, and is of the folio size, and in clare obscure. "Jesuf and the wife of Potiphar," is of a square form, and in 4to. "St. Thomas," "St. Bartholomew," and "St. Sebastian," dated 1515, are all in folio. "A young Woman mourning the loss of a Hero that Death has overcome," is a rare print in folio; by Burgkmair and Nagker.

The remainder of the letter press cuts of this artist are, a set of two hundred and thirty-seven for a folio work, of which the manuscript by Marc Treitz Sweurwein is in the Imperial library at Vienna: its title is "Der weif{Kong} (the wise king), and it confides the distinguised acts of the emperor Maximilian.

"The triumphant 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 Ambras, 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 Schauflein, is called the "Tewdruck;" but the greater number of the prints contained in it are from the graver of Burgkmair.

Johnsen, or Hans Baldung, named Grien or Grun, painted and engraved for the letter press and in clare obscure. He was a native of Gemund in Swabia, 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 considerable 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 extremities, though free and spirited, are often heavy, and not well marked:" yet considering the period and place at which Baldung 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 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 suspended from a tree, bearing the motto "Lapsus humani generis," and the date 1511. Both are of the folio size, and the Fall of Adam is a performance 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 Cross, in clare obscure. A set of four small uprights representing the Effects of Love, or Influence of Women, exemplified in the stories of Samson and Dalilah, Solomon's Idolatry, David and Bathsheba, and Xantippe and Socrates, (called by some Aristotle and Phryne), dated 1515. "A drunken Bacchus lying at the mouth of a Caft," in 4to. "The Sorceres," who is mounted on a he-goat, holding a cauldron. A pair, cut in a matterly style, of wild horaces in a forest, with the name of Baldung at length, and the date 1534. Another pair of small landscapes, which are said to be etched on plates of iron, and are very rare.
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Of Hans Brüng, a designer and engraver for the letter press, 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. Misleading 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 Brüng, and the date 1519. A set of three of the 4to. dimensions, dated 1524; 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 Saviour and twelve apostles, also in small 4to. and the three Delinities in a landscape, dated 1515, a very rare print in 4to.

Lucas or Louis Krug, or Krugen, painter, goldsmith, and engraver, was born at Nuremberg in the year 1490, 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 flipp. 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:


Hans Schauflein, the third engraver of that name, was born at Nuremberg some time about the year 1487, and died at Nordlingen, a town in Swabia, in 1550. He studied under Albert Durer, and imitated his style with considerable success.


But few libraries have the honour ofpossessing a complete copy of this celebrated work, of which Melchior Pantzing says, in the dedication to Charles king of Spain, that he had seen no less of the actions that are therein engraved and defcribed, which in fact are those of the emperor Maximilian I. under the fictitious name of Tewerdanks.

Albert Altdorfer, whom some have mistakenly supposed 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 Ratibon in the year 1511, where, having passed the routine of preparatory civil offices, he was made a member of the interior senate, and architect of the city of Ratibon, and where, in 1538, he died without issue.

Some of his pictures may yet be seen at Ratibon, and at the town house is preserved a complete collection of his engravings. The French call him "le petit Albert," prematurely in contradistinction to the great Albert Durer, and because his engravings are small, for which reason all he is usually ranked with "the little masters."

His merit was however not inconsiderable. He engraved both for the rolling-press and letter-press; 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 drawings, 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 Altdorfer; but the evident superiority of the latter master 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 1507; "Adam and Eve in Paradise;" "Solomon's Idolatry;" "Dalfah and Samson;" "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 reading in a Cavern," where is an altar, book, crucifix, and a table, 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 Marc Antonio, of "Venus accompanied by Cupid entering the Bath," and "Venus leaving the Bath:" there are small uprights and in a neat style. "Cupid Sporting with Satyrs," "Amphion faved by Dolphins," dated 1525. A pair of "Laercionknecht," and "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 "Symagogue," 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 which all but two are copies from Altdorfer, and which were published at Zuric A.D. 1604, under the forged 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 Massacre of the Innocents," dated 1511; "The Decollation of St. John the Baptist," and "The Resurrection of Christ," both dated 1512, and the latter esteemed one of the most spirited works of the master.

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The beautiful virgin of Ratibof, engraved from her statue in Ratibof cathedral, is engraved in chiaro-scuro, though these 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 distinguished by its very romantic background, both are small, but both held in esteem. "St. George and the Dragon," and "The Judgment of Paris," both dated in 1511, and "St. Christopher and the infant Christ," are in all four. A mountainous landscape with buildings, and a large tree on the right hand, another of a gateway, and a grand baptismal procession, a fort 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 fifteenth century, and was of Augsburg, but afterwards removed to Basel in Switzerland. According to professor Chiril, 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 Strutt doubts whether they ought not rather to be ascribed to Burgkmair or Baldung.

The great celebrity of his son has reflected a reflected light upon his name. Hans, or John Holbein the younger, was born at Augsburg in the year 1495 or 1498, 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, before 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 dittemper 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.

Hollin was received by the chancellor in the most friendly and flattering manner, and the family of the Morees, besides several other persons of distinction, and finally the king himself, honoured our artist byfitting to him for their portraits. Patronized by Sir Thomas, and poikelf of high talent in the arts as had not appeared in England before, he was easily received into the royal service upon very liberal terms, and to our pride was Henry of the abilities of his protege, drawing to the claims of his genius, that he frequently sat to him for his portrait, and the story which we have related of the condensation 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 but short, but as the poet on a leaf interesting occasion has beautifully said," the funds of his hours-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 said to be from his hand, and after his own designs, which adorn the books that were printed about this time at Bafle, Zutic, Lyon, 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 inferior 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 Holpese simulacra finmillina vivis?\nHoc opus Holbini nobilis carne 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 encomiums that have been repeatedly passed on the whole, namely, that "boldness, spirit, and decision are united in their execution," are only applicable to the best 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 Malchior and Gafpar Trechsel) in the year 1539, and as this was thirteen years after his departure for England, it is not easy to believe that these cuts are really engraved by Holbein, notwithstanding what is asserted 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 outstripped the skill of truth, and that a name which had refounded through Europe should be used as the trumpet of popularity and the means of profit, would be the 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 fictitious, easily contradict the complimentary inscription:

"The Dance of Peasants," engraved from a picture which he painted in the fish-market at Bafle, and evidently before his departure for England, of which fine impressions are now become rare and valuable.

The cuts for "The Praise 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."
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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-fix small upright prints, each surround-

ed by a double line border, wherein Death, in the skeleton

form, is pathetically represented as beating off an individual
from every flation 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 observe that these engravings are

not taken, as Papillon, Strutt, and others have mistakenly

supposed, from an ancient painting on the walls of a ceme-
ytery at Bafiil, 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 sup posed 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 the views of the artist, and
altogether forming a series, the idea of which was no doubt
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 Lubec,
another in the church of the Innocents at Paris, and

another in our old cathedral of St. Paul.

The cypier formed of an H and an L, which appears to

cut in the Imagines Mortis, of which the subject is
called "The Duchess," is certainly not that of either of
Holbeins, and is very likely to have belonged to some
German wood engraver, whose initials might be thus conjoin-
ed, 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 1496, and, according to Sandrart, ended his

days in Italy, a short time before the middle of the succeed-

ing century. He travelled thither 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 implicit following. He
remained several years at Rome and Bologna, working chief-
yly in the excellent school of Marc Antonio, and incorpora-
ing with the careful and patient manual execution of Ger-

many, the accurate drawing of his master, and the fine taste
of Italy and Raphael. Strutt accordingly lays 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 elec-
tor 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 die, on
which sometimes appears the letter B, whilst the abbe Ma-
rolles, Huber and Roux, contend that these prints are the
production of Balthasar.

Of the works generally attributed to this master the fol-
lowing are the principal:—the portraits of William, duke of
Bavaria; Erasmus Baderman, at the age of 30, and Leo-
nard van Eck, a counsellor of Bavaria, all in octavo. The
emperor Charles V., at the age of 30, with the Latin in-
ferior "Progenies divar quis quid for Carolus ille imperii
Cesar et ora tulit," and the emperor Ferdinand I. with the in-
ferior "Proximus a summo Ferdinando Rex
Romanorum fecit tulit ora genas," both in quarto, and marked
B.B. There are a finely engraved pair of portraits, and so
much in the style of Marc Antonio, that Vafieri 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." "Judit
beheading Holofernes," dated 1525, and in the tale of
Marc Antonio. "The Madonna suckling the Infant
Christ at a Window," (without the mark of the artist.) "A Sybil reading, and having before her a boy holding a
Flameaux," (marked B. B. but apparently after Raphael.)
"Susannah and the Elders," after Julio Romano. The
data of Lucretia and Cleopatra, both without the engraver's
mark. "The Judgment of Paris," with a back ground,
a small frieze, representing a combat, and marked
"Titus Graecus," and another small plate of a combat,
wherein soldiers are fighting with clubs, comparison to the
above. "An Infant carefiling a Dog," a small circle, dated
1523. Another Child, with a skull near him, marked
B. B. and dated 1523. An emblematical piece, inscribed
"Der Weif Lauf," 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 Ecclesiaster.

Hans Sebald 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 Sebald; perhaps he merely learned of him
the rudiments, and afterwards studied with Aldegrovius, of
whom we shall presently speak, the works of Albert Durer.

He was obliged to quit Nuremberg on account of his
libertinism, but settled soon after at Frankfort; where, how-
ever, 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 Sebald 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 sake of con-
cealment, and it may in some degree account for this varia-
tion, when we recollect that these letters are often orally
confounded among the people of that nation. The Abbé
Marolles, Le Comte, and the French writers, on the other
hand, often call him Hlbens, and Sebald de Bohemen, for
which we cannot so readily account.

Sebald Beham ranks deservedly high among the little
master; he engraved chiefly from his own compositions,
which shew a lively and vigorous invention, though some-
what hampered by the Gothic-german taste, which was
then prevalent, and which chiefly appears in the hatched
and inelegant folios with which he loaded his draperies. His
drawing of the naked, on which he seems to have justly,
prided himself, though not free from manner, is often

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correct, and sometimes masterly; his heads are expressive, and his other extremities carefully determined. The manual part of his engraving on copper, executed with the graver only, is clear and delicate. The prints which he has cut on wood are light, 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 these which he engraved between the years 1539 and 1549, with the Nuremberg cypher, we select the following: 1539, the portraits of Sebald Beham and his wife Anna, where his cypher appears encircled by buds. Two small plates of "Adam and Eve in the terrestrial paradise," dated 1540. "St. Jerome with his Lion holding the cardinal’s hat." "The Madonna suckling the infant Christ." "The Virgin of Ratibon," where the feet is represented flanding on a crescent, and surrounded by radiance, and "The Death of Dido," all dated 1540. "St. Anthony writing in the desert," and "St. Sebald, (the patron saint of Nuremberg)," sitting among trunks of Trees, and holding in his right hand the Model of his Church," both dated 1524. "Two Peasants marching and playing on the flute and bag-pipes, and a male and female Peasant Dancing," dated 1528. "A Triton supporting a Nereid," dated 1532. "Force, allegrovised by a Woman sitting on a Lion," dated 1534. "A young Man sitting under an Arbour embracing a young Woman," dated 1526. "The Death of Cleopatra," dated 1529. An ornamented vase with an inscription. "A combat between the Greeks and Trojans," inscribed "Krichen und Dreetjen," and another combat, inscribed "Achilles and 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 most esteem.

A vase enriched with sculptured ornaments, at the base of which are two fayrens, dated 1531. "Adam and Eve carelessly each other." "Adam and Eve in Paradise," between whom is Death, with a serpent wound round him, presenting the fatal apple; a high finished plate, dated 1543. "The emperor Trajan arrested at the head of his Army." "Melancholy and Patience," two female figures, the former copied from the celebrated engraving of the same subject by Albert Durer, dated 1539; the latter figured on a column, which is inscribed "Patience," and dated 1540. Another pair, of Good Fortune and Evil Fortune, the former figure flandering and holding a wheel, the latter arrested in her course by an evil genius, who is presenting her with a lobster or crawfish. An etching of a buffoon presenting flowers to a young woman. A set of the four evangelists, dated 1541. Another set of twelve of the labours of Hercules, dated from 1542 to 1548. "Ein Einzig beating a Drum," inscribed "Im Bauer 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 Maximilian, a hexagonal print, inscribed "Sebalt Beham, von Nurnberg, malt, jükt wohnhafter Burgker in Frankfort," dated 1544. Both of Domitian in the manner of an antique medal. A set of six, and a title-page of the months represented by male and female peacants dancing, the first dated 1545. "The Judgment of Paris," dated 1546. "Death seized from behind by a naked female," a beautifully finished plate, dated 1547, with the following words inscribed on a stone, "Omnes in homine venalium mors absit." "A Man endeavouring to root up a Tree," dated 1549, and inscribed "Impedibilis, &c," and a virgin and child copied from Bartholomew Belian, dated 1549.

The letter-press cuts 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 Passion of our Lord, two of which are marked with his former, and two with his latter cypher. An "Holy Family," in which St. Joseph is plucking fruit. "The Virgin and Child." "A Penitent." "St. Jerome with a Bible 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 last-mentioned engravings are very rare; a set of three hundred and forty-eight, engraved for "Biblique Historique Artificiosime depictum," printed at Frankfurt in 1537. But it is to be observed that there are two editions of this hible, of which the former is in Latin, and the latter, dated 1539, is in the German language.

Gregory Peins, or George Pentz, was also a native of Nuremberg, born in the year 1500. He first studied in the school of Albert Durer, and profited much by the instructions of that distinguished master, but it was in Italy, and under Marc Antonio, that he finished his taste, formed his style of engraving, and acquired that correctness of drawing 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 precision a degree of freedom which was unexampled. He appears to have worked on some of the best plates that pass under the name of Marc Antonio.

The far greater number of the engravings of Peins are of small dimensions; wherefore he is usually classed among "the little masters;" but he has produced some few large prints; 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 specimen of the artist's superior abilities."

Peins died at the age of fifty-six, but where, his biographers have not mentioned: his monogram will be found in our plate of those of the German school; and the most esteemed 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 Imago Duxore Gregori Peins." From this engraving it should appear, that the name it bears was the true name of our artist, and that the name Georgius Pentz, which appears under his large plate after Julio Romano, is probably an error of the publisher Van Aelst. Portrait of Jean Frederic, doctor of Saxony, a rare print, dated 1535.

The belt of the historical works of Peins are, a pair of "Either before Ablution," and "The Temptation of Job;" another small pair of "Judith in the Tent of Holofemes, and Judith appearing afterwards with his Head;" another pair, finely executed, of "Solomon's Idolatry," and "The Judgment of Solomon."

Peins appears to have professed some judgment, at least some humour, in pairing his prints; the next companions which we have to notice, are "Susannah 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 consisting of four plates; another set from the history of Tobit of 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 inscriptions. Another set, very highly finished, consisting of twenty-five, from the Life of Christ. "Hedelia receiving

But his principal and largest work, of which we have already spoken, is "The taking of Carthage by the Romans," after Julio Romano.

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 Zontl in Welfphalia, 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 Aldergraft; while others, perhaps, mistaking some of the smaller works of Albert Altdorfer for his, lay that his christian name was Albert; but professor Christ affurés his readers that the name of this artist was Henry, and not Albert; and upon his own portrait his name 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 Grecian art; and Germany from the engraving, which were brought thither from Italy. Aldegrever is a lofty object, which receives the first faint rays of a rising sun, and is universally allowed by his critics, that had been refuted in Italy, "the genius and ability which displayed itself so conspicuously in his own country, would have shone with double luster."

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 Naenteil 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 Abbe Marolles had seen at least three hundred and fifty different prints from his graver, of which the following list contains the names 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 solicitude for his fame, advises the collector to be circumstant as to the impressions he admits into his portfolios. His monograms may be seen in six 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 1549; Philip Melarchon, of the same date; and Albert Vander Helst, aged 28, and dated 1558; all in quarto.

His folio portraits are those of William Duc 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 quarto.


The only etching from the hand of Aldegrever is now become very scarce; its subject is Orpheus and Eurydice, dated in 1526, and in 12mo.

James, or Jacob Bincck, was also of Nuremberg, or, according to some authors, was born at Cologne, in the year 1504, 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 behoves more feeming facility than that of Aldegrever, and when at the hot, more of Italian taste. He apparently studied also, and imitated, that of Marc de Ravenna.

His cypher, composed of the initial letters of his name, is 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 Bincck are, "A young Man drest in a Bonnet, holding a Skull under his Cloak, and a Cup in his Right-Hand." This, according to Sandart, 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, Christianus II, surrounded by ornamental architecture; a young prince, dated 1526; Luke Gaffeo, dated 1529; the archduchess Elizabeth of Denmark; a pair, of Martin Luther, inscribed "In sentio Vela," and Philip Melanchthon, 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 fayirs, and attendant nymphs are playing on musical
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musical instruments, dated 1528, 1529. A set of the Seven Planets personified. Another of the Seven Cardinal Virtues. An emblematic piece on medallion, in which a flaming heart, i.e., an heart of ardent virtue, is beaten on an anvil, by four allegorical females: figures, as we are informed in Bihlaib Pirkheimer's emblems, are Experience, Easy, Tribulation, and Intolerance, marked 15. L. B. 29. "History," a female figure with wings, writing. A pair of "Peacocks marketting with People of Superior Condition." A set of twenty, of Divinities standing in Niches, copied from Curalicus, who copied them from Rosso.


"A Woman besatting the Devil with a Dilaff;" "A Woman advancing with Surprises 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 standing in a Niche devouring One of his Children," a small upright, which differs in the style 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 Buinck Colonienis, fecit 1530."

Another of the "little masters" of Germany was Hans or John Brosamer, born at Fulda, in the circle of the Upper Rhine, in the year 1506. His manner of engraving often bears resemblance to that of Aldegrever, but the school in which he studied is not known; sometimes, however, he differs from that distinguished master by interworking the lines of his draperies and backgrounds with flapping. 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 H and B, 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 1541.

And in history; "Samson and Dalilah;" "David and Bathsheba;" and "Solomon's Idolatry;" dated 1543, all small uprights. "Xystippe and Socrates;" "Laeocoon and his Sons," dated 1538; "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 Christian Heroes;" a rare print, engraved on wood, and sometimes attributed to Burgmair; and "Biblia Veteris Testamento artificialis picturis effigie," 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, nature, or truth.

Augustin Hirchfogel was born at Nuremberg A. D. 1526, and died in the same 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 incorrectly drawn.

The singular monogram of Hirchfogel, surmounted by a little crofs, will be found in our first plate of those of the German school, and his principal productions are as follow:

The "Raphael's slaughter of the Innocents," from a sketch by that master, which differs from the print by Marc Antonio, dated 1545. A set of four, and another set of six landscapes, from his own compositions of castle 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 fca-ports, with flippings, &c. dated 1549.

Henry, whom Strutt has mistakenly confounded with Hans or John Lautenfack, was also of Nuremberg, or, according to some authors, was of Doppelmair, 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 1596.

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 same place and family with the preceding, was Hans Sebald Lautenfack, who was born in the year 1508, but of the principal events of whose life, and the time of whose death, we are ignorant.

His portraits are held in esteem among connoisseurs for their truth of resemblance; and his landscapes, which are chiefly etchings, 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 combating the Great Goliath," dated 1551. "The Blind Man of Jericho, restored by our Saviour," and another miracle of "The Devil cast out from the Canaanite," both dated 1550. "Balak and his As," in a very mountainous landscape, and a very rich scene of "The Labours of the Vintage," are also dated in 1550, all of the folio size. An upright landscape with a large farm, dated 1551. A pair of interesting and extensive scenes in 4to. dated 1552 and 1555. A grand tournament, of large folio dimensions, entitled "Equitria pedeslirique pinguiscon." 1560; and another grand joust, entitled "Secundum Circumenv Ludorum, etque certamen continentis," 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 1552 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. Heroumnius Steurtab. 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 engravings, which Holzer afterwards made the foundation of his style. David was the most industrious of the three, but deflected 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 "le 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.

The principal works of David, are the portraits of Nero and Galba, of the 400 size, as medallions. Carolus Rex Catholicus, the fame. Martin Luther, dated 1523, and Claude Sturzbecher, a rare print in folio.

Of his historical engravings, we shall mention, "David beheading Goliath," in 400, and "David Playing on the Harp before Saul," in folio, dated 1537. "The Adulterous Woman;" "The Presentation in the Temple;" "The Last Judgment;" and "A Grand Altar;" with the figures of Jesus Christ, the Virgin Mary, St. John the Baptist, and others, all in folio. A fort of ridiculous "Morice Dance of Grotesque Figures," "The Monopolier of Grain, excrated by the People," inscribed, "die Sprich Solomo, Das Inhalts." A subject from the 10th chapter of Solomon's Proverbs, dated 1534, both in folio. "The Three Great Jewels, Jews, David, and Judas Maccabeus, on horseback." "The Three Christian Heroes, Charlemagne, King Arthur, and Godfrey of Boulogne," companion to the above, both in 400, and after Hans Burgmaier. "A Grand Village," of figure form and folio dimensions. "Two Females Surveying themselves in a Mirror, behind whom are Death and the Devil." Two very grotesque figures, inscribed "Bolhka, Markela," in folio. "The Crucifixion between the Two Thieves." Another "Crucifixion," in which St. John and the Virgin Mary are introduced, the latter pierced by a sword, in allusion to her excessive grief; and a small copy of a celebrated work of Andrea Mantegna, of "A Combat of Marine Monitors." "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 Combating the Hydra," is from Andrea Mantegna; and the best from his own designs are "Lucina holding a Moon in her right Hand, and a Flaneau 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 still less merit than his brethren, was Lambert Hopfer, who composed in etching a great number of the wood cuts of Durer, but his works display little taste and less 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 border, which is esteemed the best of his engravings.

Strutt has added to these another Hopfer, for whom he claims equal merit with the first. The initial letter of his christname was an N. He worked with the graver, but imparted to his lines somewhat of the roundness of etchings, and drew more correctly than David or any other of the family. To this artist he ascribes "The Call of Jeremiah," a small upright, dated 1525. "A female Saint, holding a Palm Branch, and several Figures sleeping with the Deity appearing above," which, he says, is "a line spirited etching."

David Funck, a printseller 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 matter 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 Jott 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 classed 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 vile pollutants of Aretin, he had his eye put out by the sentence of the magistrate." Strutt presumes, 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 had nearly coilt him his life,) to which the poet Aretin did but supply verses.

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 Anabaptists," a small plate, after Aldegrove. A set of four plates of fragments of ancient architecture. A set of six heads of Roman emperors, small. A pair of small frises, in which are numerous parquequets. 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 Anglicus, both of which books were printed at Frankfort in the year 1581.

Melchior Lorich, 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 favourites, which are now become very rare, and where he formed a collection of Turkish dresses, 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 they
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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 more short-handed. 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 short-handings, and is finished in a style of neatness equal to that of Jerome or Anthony Vicrius, 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 Lorich, which are held in most request among connoisseurs, are: the portrait of Martin Luther, dated 1528. That of Albert Durer, with four Latin verses, dated 1559, a very rare print, done in imitation of a Cameo, and those which we have mentioned above of the grand seignior and his favourite fulta, very neatly executed on copper, and very scarce. Ariosto, the Staggryrite, dated 1561. "St. Jerome in the Desert," dated 1556; and a small upright of a female head, beautifully executed, are also on copper.

His best engravings on wood, are a set mentioned above, of the costume of Turk, in small folio, dated from 1570 to 1581. "The Tiburtine Sybil," dated 1571, executed in his best style. "A Woman preening her Breast, with numerous Animals below," and inscribed "Ops Saturni conjux materque Deorum," a very spirited engraving in folio, dated 1565. And "The Deluge," a large folio, engraving 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 works of Sebad Beham. He worked almost entirely with the graver, and acquired a neat and free style, which was well adapted to small subjects, in which numerous figures were required to be introduced, such as plate, and funeral, porcelaneous. 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 Boissard'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 Boisson, and his principal engravings are those which follow: an etching of "St. John in the Desert," a rare print. A pair of "The Fountain of Youth," and the "Little Village Fair," copied from Sebad Beham. "A Bacchanalian Procession," from Julio Romano. Three mixtures of the grotesque with the allegorical, of the circular form. "The Golden Age," a small circle, after Abraham Bloemaert. A pair of portraits in medals of Scanderbeg and Donice his wife. A set of nine figures of the mutes, in folio. The plates for the four first volumes of Boissard'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 Harriot, servant to Sir Walter Raleigh," from drawings by J. White, printed at Frankfort by J. Wechlerius, A. D. 1599, which were afterwards copied by Picart, for his "Religious Ceremonies, &c." The plates to the Latin narrative of Spaniard cruelties in America, published 1598.

His largest work appeared in the same year, and is entitled "Descriptio Indicis Orientalis et Occidentalis," in nineteen tracts, which are contained in five folio 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 within the garter, and, in a compartment below, his name, titles, &c. are written in French. The last stall 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 hilly for an English prospect,) interspersed with castles, churches, houses, rivers, woods, &c. and an exact view of Windsor castle as it appeared in that reign. The roll is fifteen feet three inches long, and was engraved on twelve plates."

Hollar to his plate of the procession, copied in small from this engraving, in Ashmole's order of the garter, says, "the original was designed by Marc Garrard, who could be then only fifteen years old." Wherefore Strutt concludes this to be a mistake, but perhaps Garrard made a reduced copy from this print, from which copy Hollar's plate was engraved, which would reconcile the accounts; for Lord Orford dates Garrard's drawing in the year 1584, whereas De Brie's plate was finished in the year 1578; and Strutt, reasoning from the dedication being made in the name of Thomas Dawes, Rouge-Croix, concludes that it was designed by him.

Strutt says he never heard of any other imitations from this plate than the proof, which, after belonging to the Norroy king at arms, came finally into the possession of John Penn, esq. of Earl Durham in the county of Norfolk; but the engraving is mentioned by Huber, and presumably 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 plate; 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 1561, 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 united his father's literary parts to those works in which
which he engaged, as well as in the engravings; but Jean Israel, the second son of Theodore, who also afflicted, and succeeded him, was far less successful.

The brothers John, Theodore, and Israel, completed the plates for Boissard's Roman Antiquities, and added several to the collection of portraits of illustrious persons, which their father had begun to form.

Among other portraits, we find those of Gerard Mercator the celebrated geographer, and Daniel Specklin, both in 1450.


Jean Keleti was born at Dresden in the year 1530; under whom he studied is not known, but he continued engraving in his native city, until some time about the close of the sixteenth century. He engraved some plates after Jean Marie Losienni, who was sculptor and architect to the electors of Saxony, of which the following are those of most importance.

"Nimrod building the Tower of Babel;" "The Destruction of the Babylonian Empire;" "The Empire of Rome," in the back ground of which is the death of Cæsar. "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 supporting a globe, all of the 4to. size.

Tobias Stimmer was born at Schaffhausen towards the close of the sixteenth century, but resided chiefly at Strasbourg, 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 compositions; the engravings in the "Novissimo Tobias Stimmeri sculterum Bibliothecarum figurarum verissimi Latinis et Germaniae expolterem," are from compositions by Stimmer, though he was as diligent in the engraving by his brother Christophor, and his pupil Christophor 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 bible with attention and with great benefit, and Sandrart, 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 passed 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 poises the means of shewing his talent, despair; it was the pleasure he received from some of these, which accidentally caught his notice, that occasioned the margrave to engage Stimmer in his service, and became the foundation of his fortune. For him our artist painted the history of his ancestors, and the margrave's own portrait to this day affords 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 Christophor Stimmer was born at Schaffhausen in the year 1552, and died at Paris some time about the commencement of the succeeding century. He was the brother and disciple 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 mellow style.

After the death of his brother, Christophor travelled to Paris, where he performed some engravings, and was commonly known by the name of "the Swiss," and where he died, leaving behind him a son, who also engraved on wood a considerable number of plates after Francis Chauveau.

Christophor used the complicated cypher which will be found among those of our monograms of the Schaffhausen school, and his bell engravings are those which follow. — A set for the New Testament, with the Apocalypse, printed at Strasburg in the year 1588. A collection of portraits of the scholars and theologians of the German nation, printed also at Strasburg by Bernard Jobio, in 1591. "Icones Affrare," a collection of emblems printed in the same year, all of the 4to. size; and a capital print of an historical portrait of a kneeling figure, inscribed "Contrasta pictus Bildnus des Hermann Lusarar von Schwende," &c.

Joel or Jodocus Amman 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 encouragement 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 attach himself to his adopted country. Strutt says of him, that if patience and industry of themselves could constitute an artist, Amman would well deserve that character, from the multitude of deligns 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 it is equally certain that neither patience nor industry can create a great genius. Much merit, however, was certainly poiffed by our artist; who lived at a time when almost every book which appeared was ornamented with prints, and was employed by many of the great booksellers, especially Siegmund Feyeranbandt of Frankfort.

The engravings of Joel Amman 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, yet if 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 illustrious women, beginning with Eve, under the title of "Eva die Gebererin?" a set of figures of warriors, small uprights, marked Joel Amman inventor 1590; the set consists of eight, and there is a set of eight others, fighting with swords and flails. The four feaons, and the four elements, dated 1569. A set of the twelve months, perfonified, and a set of fifteen friezes of hunting subjects; a considerable number of etchings of subjects of piety, after Winckelmann Jamitzer; the bombardment of a city, dated 1570, in folio, and the portrait of Carparis di Colignon, D. Caillidone, marked Joel Ammon Figurinum, 1573. His best engravings on wood are, "The Creation of Man?" "The New 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 liberum mechanicum et fedentarium artium genera continens, &c. Edit. per Hollmann Beoperum Francof. 1564." This work
work consists of articles and artificers, 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 Feyerabendt, for a Latin edition of Livy, printed at Frankfort A.D. 1572, in oblong quarto.

Another set for a folio edition of Pliny, printed also at Frankfort A.D. 1584. Another set for a quarto book of hunting, printed at Frankfort 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 1564, and another of one hundred and twenty, for "Gynaecium, Sive Theatrum Mulierum, in quorum praecipuarum omnium per Europam, &c." in oblong quarto, printed at Frankfort, 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 Wintertour in 1614. His father Joffannu 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 passing 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 just 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 etchings relative to proceedings in the courts of law, which, after the death of the artist, were introduced into a Latin book.

Of his letter-pref engraving, which are neatly executed, the belt are probably the first 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 Vorlesungen über die ganze Bibel," which do honour to his inventive talent, as well as to his manual powers as an engraver.

Christopher Jamitzer, or Jamnitser, was born at Nuremberg in the year 1560, 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 flirt rate merit.

Of the same family were Bartholomew and Wenceslaus Jamitzer, whom we pafs as unimportant persons.

The best works of Christopher consist of groups of boys variously occupied, and the best of these groups are those which follow: A set of twelve, in 12mo.; another set of twelve, mounted on marine animals; another set of four combined with swans, flowers, &c.; four children dancing in an arbour. A set of grotesque chimeras, in quarto; Christopher Jamitzer also engraved a portrait of himself fitting in a perspective machine, in the act of drawing or meaffuring.

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 1639, he died.

Strutt describes him as a man of genius, but so much praise as is implied in this word, cannot justly be allowed him. He worked partly from his own compositions, but his drawing is by no means correct; his extremities in particular being sadly 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 Seraphinus Olivarius Razzaliius; all in quarto.

Of his historical works we shall only mention "The Virgin and Child," lasted in a landscape, after Baroccio. Mary Magdalen leaning her hand upon a skull, after S. Gaetano, dated 1584; both in quarto. An emblematical print of Venus standing on a globe, with various virtues and vices personified, very neatly etched, and marked M. Greuter inv. et fec. 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 Vorlermann, a large print of the frieze form, engraved on several plates.

As to Jean Frederic, the son of Matthew Greuter, was born at Rome, and bred, 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 1634. He studied in Italy, and beside 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.


Of Adam Ellheimer, furnamed Adam of Frankfort, who should else have been mentioned in this place, we have already spoken. See Elheimer.

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 boldnefs, freedom, and facility, but his chiaro-curo 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 Colmo de Medicis, dated 1618. "The Lail Supper," in large folio, after the fame. "The return of the Holy Family from Egypt," where the infant is embracing Jesus Chrift, after F. Bigio, also in folio. "The infant Saviour blefing the little St. John," after the fame painter. And "A Prince on a Tribunal, surrounded by divers Statesmen," after Lanfranco, and inscribed "Vox mibi."

Cruger has also engraved some portraits after Gabriel Waver, to which he signs his name Ditrich Cruger, by which Chriftian name he is yet known in Italy.

Theodore
GERMAN SCHOOL OF ENGRAVING.

Theodore Cruger, the younger, was born in the year 1618, and was the son of the preceding artist. The Italians call him Della Croce, the Flemings Verorens, and the German Kruger. In the year 1710, he engraved, in concert with two others, the Florentine gallery. He also engraved "St. Francis at Prayer," after Carlo Maratti, and a couchant Venus, both in folio, before several portraits, among which is the daughter of Georgione, after that master; and Ludovico Asdmar, after P. Dandini.

Dominic Culfos, otherwise called Balten, was the son of Pierre Balhan, a painter and poet, who had some pretensions also to knowledge in the art of engraving. He was born some time about the year 1560 at Anvers, and died at Augsburg in 1612. His real family name appears to have been Balten, but he settled at the last named city, at an early age, under the name of Dominique Culfos, and married there the widow of Barthelmy Kilian, the elder, who was enabled to establish a lucrative print trade, which continued to flourish for a long period of time.

Culfos had several daughters, of whom some were educated to the art of engraving, and succeeded tolerably well. He worked in a neat style, entirely with the graver, but his prints are laudable, smallsized, 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 assertion, there is not the least resemblance between the fine portraits of Culfos, and those so highly and justly esteemed by Vandyke.

The principal engravings of this artist, are: the effigies of the German emperors, large whole length figures, in folio, dated 1601.

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 ornamental title, but the names are added, of Lucas and Wolfgang Kilian. Another set of portraits of heroes, &c. entitled "Atriurn Heroicum, Zafarum, Regum, aliorum famulatum ac principium, &c."

The chief of his engravings of separate portraits are thofe of pope Sixtus V, prince Sigismund in the costume of Moldavia, after J. ab. Aeh, and from the same painter Marcus Bragadino, dated 1591. Christianus II. duke of Saxony, Henry bishop of Augsburg, in an oval, Johan Philipp, bishop of Bamberg, ditto, Maximilian, duke of Bavaria, and Elizabeth Laffaringen 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 length, after Franz Apspruck. A set of four in folio, of "L'Histoire de l'Enfant prodigue," and "Judith beheading Holophernes," after John Von Auchen, 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 studied, is not known, but the works of Hevely Goltzis and Muller appear to have been his school. He 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 author, 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 impressive.

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 Palm. The same subject, a large upright, after Springer. Another of the same subject, after Rotenhamer. And another (a large upright) from J. Heinie. "A Holy Family," from Cornelius de Haelroem, and "The Miracle of the Loaves and Fishes," from Tinoretto: both large uprights. "Christ Praying in the Garden," a small upright, arched at the top, from Frederic Sutius. "A dead Child," from Michael Angelo. And "A Nymph and Satyr," from J. Heinie, both small uprights. "The Rape of Proserpine," a large folio plate, from the same master. "The Entombment of Christ," an upright, without the painter's name, dated 1602, 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 Culfos, vulgo Balten, Pictor et Poeta Antverpianus," dated 1609. Nicholas Chriophe, Prince de Rudzivil, both in 4to. The emperor Chriilian II, dated 1615. Maria Eleonora Suevorum Gothorum Regina. Aulavus Adolphus Suevorum Gothorum Rex. And Albert Durer, a half-length; all of the folio size; but whether the latter is from a picture by Rotenhamer, 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 Culfos, and, after his return from Italy, under his brother Lucas, whose style he imitated without attaining to the same degree of excellence: his prints are somewhat neater, but more fliff and formal.

Wolfgang employed the greater part of his time in engraving portraits, of which the following are those of most importance. Ernst Count Mansfield. Maximilian of Walenfein, dated 1622. Jean Major, mathematician of Augsburg. Frederic Baron de Tuffenbach. Jean Goden, Bishop of Wurzburg. Ferdinand III, king of the Romans, all in 4to. Of the folio size: the archbishops of Mayence, Cologne, and Treves; his own portrait, inscribed "Labor impessus omnis vincit," and a set of twenty-seven of the emperors and archbishops of the house of Austria, from 1229 to 1625, 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 Tinoretto; "The Descent from the Cross," after Paolo Farinato, and the "Good Samaritan," after Giacomo Bassano, all in folio. "The Resurrection of Christ," arched at the top, after F. Basso. The four Evangelists, in upright ovals, from his own design; and the "Festival of the Peace of Weilphalia," after Joab 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 1666. 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 Magdalen 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

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work consists of artifices and artificians, 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 portraits of Feyerabandt, for a Latin edition of Livy, printed at Frankfurt 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 1593, 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 1564, and another of one hundred and twenty, for "Gynaecium, vix Theatrum Mulierum, in quorum prenecum 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 Johina 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 cyprian of Maurer will be found in our second plate of German monograms. After passing some years in the school of Stimmer, he returned to his native city, and added to his reputation by his rare pictures which adorn the fassades of distinguished houses, and by the just 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 etchings relative to proceedings in the courts of law, which, after the death of the artist, were introduced into a Latin book.

Of his letter-prest engravings, which are neatly executed, the best 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 "Hilfskrafte Vorstellung über die ganze Bibel," which do honour to his inventive talent, as well as to his manual powers as an engraver.

Christopher Jamitzer, or Jannitzer, was born at Nuremberg in the year 1560, 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 Jamitzer, whom we pass as unimportant persons.

The best works of Christopher consist of groups of boys variously occupied, and the best of these groups are those which follow: A set of twelve, in 1200; another set of twelve, mounted on marine animals; another set of four combined with fawns, bowers, &c.; four children dancing in an arbore. A set of grotesque chimeras, in quarto; Christopher Jamitzer also engraved a portrait of himself fitting in a perspective machine, in the act of drawing or measuring.

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 1638, he died.

Strutt describes him as a man of genius, but so much praise as is implied in this word, cannot justly be allowed him. He worked partly from his own compositions, but his drawing is by no means correct; his execution in particular being 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 crown is introduced. Cardinal Seraphimus Olivarius Razzalins; all in quarto.

Of his historical works we shall only mention "The Virgin and Child," seated in a landscape, after Baroccio. Mary Magdalene leaning her right hand upon a skull, after S. Gac- tano, dated 1684; both in quarto. An emblematical print of Venus standing on a globe, with various virtues and vices personified, very neatly finished, and marked M. Greuter inv. et fec. 1587, in small folio. "The Fall of Phaeton," after Windel Dieterlin, in large folio, dated 1588. "The Destruction of Troy," after Laurence, and the magnificent cavelade of the emperor Charles V. engraved by Greuter in concert with Marcus Vorderman, 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 1634. 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 adixture 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 Shepherd," 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 4to. 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 Elsheimer, furname Adam of Frankfort, who should else have been mentioned in this place, we have already spoken. See Elsheimer.

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 Francesco 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 Colmo de Medicis, 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 bleeding the little St. John," after the same painter. And "A Prince on a Tribunal, surrounded by divers Statesmen," after Laurence, and inscribed "Vox mildi.

Cruger has also engraved some portraits after Gabriel Wayer, to which he signs his name Ditrich Cruger, by which Christian name he is best known in Italy.

Theodore
GERMAN SCHOOL OF ENGRAVING.

Theodore Croger, the younger, was born in the year 1648, and was the son of the preceding artist. The Italians call him Della Croce, the Flemings Vercruys, and the German Kruger. In the year 1710, he engraved, in concert with two others, the Florentine gallery. He also engraved "St. Francis at Prayer," after Carlo Maratti, and a coauntich Venus, both in folio, beside several portraits, among which is the daughter of Georgione, after that master; and Ludovicus Adimari, after P. Dandini.

Dominic Culfos, otherwise called Balzans, was the son of Pierre Baithafar Baltens, a painter and poet, who had some pretensions also to knowledge in the art of engraving. He was born some time about the year 1560 at Anvers, and died at Augsburg in 1612. His real family name appears to have been Balzens, but he settled at the last named city, at an early age, under the name of Dominique Culfos, 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.

Culfos had several daughters, of whom some were educated to the art of engraving, and succeeded tolerably well. He worked in a neat style, entirely with the graver, but his prints are laboured, taillefs, and without harmony of effect. Florent le Comte says he engraved portraits in the style of Vandyke, but as Strutt properly remarks of this mistaken assertion, there is not the least resemblance between the fluff portraits of Culfos, and those so highly and justly esteemed by Vandyke.

The principal engravings by this artist, are: the effigies of the German emperors, large whole length figures, in folio, dated 1594.

The portraits of the Fugger 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, Cæfarum, Regum, aliorumque summatum ac principium, &c."

The chief of his engravings of separate portraits are those of pope Sixtus V. prince Sigismund in the costume of Moldavia, after J. ab. Aeh, and from the same painter Marcus Bragadino, dated 1601. Christianus II. duke of Saxony, Henry bishop of Augsburg, (in an oval) Johan Philipp, bishop of Bamberg, ditto. Maximilian, duke of Bavaria, and Elisabeth Lotharingea 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 Frez. Aipruck. A set of four in folio, of "L'Histoire de l'Enfant prodigue," and "Judith beheading Holofemes," after John Von Auchen, 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 studied, is not known, but the works of Heury Goltzuis 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 1617.

"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 author, 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 impressive.

Of the numerous works of Kilian, the following are held in most esteem: "The Adoration of the Shepherds," a middle-sized plate, from the younger Palma. The same subject, a large upright, after Spranger. Another of the same subject, after Rotenhamer. And another (a large upright) from J. Heintz. "A Holy Family," from Corneinits de Haerlem, and "The Miracle of the Loaves and Fishes," from Tintoret: both large uprights. "Christ Praying in the Garden," a small upright, arrows, at the top, from Frederic Suffolk. "A dead Christ," from Michael Angelo. 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 1600, which perhaps, with many other of the engravings of Lucas Kilian, is from his own design.

The belt portraits by this master, are those of himself, aged 55, a rare print in folio. "Petrus Culfos, vulgo Baltens, Pictor et Poeta Antwerpianus," dated 1620. Nicholas Chriolopez, Prince de Rudzivill, both in folio. The emperor Christian II. dated 1615. Maria Eleonora Suevorum Gothorum Regina. Gualtavus Adolphus Suevorum Gothorum Rex. And Albert Durer, a half-length; all of the folio size: but whether the latter is from a picture by Rotenhamer, 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 Dominic Culfos, and, after his return from Italy, under his brother Lucas, whose style he imitated without attaining to the same degree of excellence: his prints are somewhat neater, but more still and formal.

Wolfgang employed the greater part of his time in engraving portraits, of which the following are those of most importance. Ernest Count Mansfield. Maximilian of Wallenstein, dated 1542. Jean Major, mathematician of Augsburg. Frederic Baron de Teufflenbach. Jean Gedeon, bishop of Wurzburg, and Ferdinand III. king of the Romans, all in folio. Of the folio size; the archbishops of Mayence, Cologne, and Treves: his own portrait, inscribed "Labor incipiens omnia vincit," and a set of twenty-seven of the emperors and archdukes of the house of Austria, from 1229 to 1625, 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 Titiorcetto; "The Departure from the Cross," after Paolo Parniato, and the "Good Samaritan," after Giacomo Baffano, all in folio. "The Resurrection of Christ," (arched at the top), after F. Baffano. The four Evangelists, in upright ovals, from his own designs; and the "Festival of the Peace of Westphalia," after Joab Sandrart, in large folio, engraved on two plates, and which is now become a rare print.

Bartholomeu Kilian, the third son of Wolfgang, was born at Augsburg in the year 1612, 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 Magdalen after M. Gondolbach, which induced his father to place him under M. Morian 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 affirms 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 Barthelemy talk of him as an example for a painter, but these writers are warmer in their 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 length portraits, in folio, of celebrated protestant preachers at Augsburg, after B. Hopfer. Three medallions of archbishops of Salzburg, with allegorical accompaniments, after Henry Schoenfeld. Johannes III. king of Poland, after Bleemart, dated 1681; a large built of learned execution. Maximilian Emanuel, electoral prince of Bavaria, with historical accessories, a celebrated work, and the subject of a thesis. The emperor Joseph as king of the Romans, on horseback, the subject of another academical thesis, da'd. 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 Eimildenius, is a large upright folio, dated 1686.

The best historical production of Bartholomew is a "Madonna and Child," a beautiful engraving in large folio, after Caspar 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 equalled, though many of his works possess no small portion of merit. Strutt mentions another engraver of this family of the name of Wolfgang Philip, 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 an hereditary taste for fine art. He first studied drawing and engraving under Frederick of Augsburg, and afterwards became the pupil of G. M. Prieder of Nuremberg, where he distinguished himself by engraving some plates for the "Physica Sacra of Schuchzer," and laid the foundation of his future fame.

Some years after, while engaged in engraving from the Dresden gallery, the reputation of our artist flogged 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 used to say, in the way of delicate reproof, that it ought to be re-engraved by Kilian.

But his art was withstanding these honours, felt so much satisfaction, while 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 four years.

P. A. Kilian is usually reckoned among the most meritorious historical engravers of Germany. On a basis of good 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 loose, upon the first, and sometimes added a third course, somewhat more square; at other times he interworked his shadows with long slender tacks, 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 best historical engravings are, "Jesus 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 Titorets; 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 Grali; "The Baptism of St. Augustine," from J. B. Pittoni; and "Herodias with the Head of John the Baptist," from Carlo Dolce, are all of folio dimensions, "Regina Angelorum," where the Virgin appears surrounded by Angels in Glory, after Bergmüller, and another from the life of the Virgin, after C. T. Schelther, are a large and highly esteemed pair of engravings. But perhaps his most jubilantly celebrated work is a very large plate of "St. Cosmo and St. Damian," after J. Wolfgang Baumgartner.

The best 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, Pontif Max, after G. D. Porta, a pair in large folio. Maria Therezi, queen of Austria, an upright folio. Johan Martin Crillfell, from a picture by P. A. Kilian, himself, Christoph Henry Andre Geret, after J. Romelli. Field marshall Curtius Christopel Graff von Schederen, after Stranz. Ferdinand, duke of Brunswick, general in chief of the allied army, after Ant. Pefne; and Godofredus Schurzefius, marked P. A. Kilian, pinx. et sculp. 1750, of all the dimensions.

George Christophor Kilian, another engraver of the same family, was living at Augsburg when Heineken published his "Idee generale d'une Collection complete d'Estampes," and perhaps may be living still.

Ifase Major was born at Frankfort on the Maine in the year 1718, and died in 1749. 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 Stephani. 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. St. 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, as 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.
moved 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. Collectors should therefore bear in mind, that those impressions, from which the name of Rubens as the publisher is taken away, and that of Jegher fabricated, 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 hatching is broad and powerful, and the imitation of the engravings is so well expressed, that his belt prints very much resemble drawings made with the pen and ink. He drew with masterly correctness; the extremities of his figures are well marked; and his heads, though flight, are full of expression.

His belt, 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 surprized by the Elders." "A Repose in Egypt," both in large folio. Some of the latter are printed in chiarofauco, i.e. with an additional block or two to add the dimittins, and are now become 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 Envy and Difcord," is from the etching 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 matter, which was also engraved on copper by Bolfwert.

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 flight free style, and finished with the graver. His views have much of that rare and 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 and the honour of 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 those 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 58, at Frankfort, or, according to some of his biographers, at Schwabebach.

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 works 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 but 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 most cases is a great misfortune, but not so here, for her mother found in her second husband, Jacques Morell, a kind and indulgent protector, who fostered 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 she 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 expliquées par Marie-Sybille Merian; ou l'on traite de la génération et des différentes métamorphoses 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 the paid attention to the engravings as well as the designs, it being the first work wherein is displayed the minia which is so important in the eye of the connoisseur, and that she used 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 Wefl Friedland, and became a member of the fraternity of Labadistes. The fraternal society of Labadistes, (who called themselves brothers and sisters,) had then assembled under Peter Yrond, and their head-quarters were the castle of Den Bofch, situated between Franker and Lezard, of which the possessor's name was Sommerdyck. 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 forth 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 drawings, 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 Surinamensis, &c." several were executed by herself, and the rest 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 confirmed the rest 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 interposed to prevent this consummation of the pleasures of Maria Sybille.
Sybille. The supplement was however published by her second daughter Dorothia 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 visitants.

John William Baur was a very meritorious painter and engraver of landscape and history. He was born at Strafbourg in the year 1600, studied under Frederic Bredel, and afterwards in Italy, where he resided a considerable time, and where he was patronized by the duke of Bracciano and prince Guilielmini. In the year 1627 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 water colours 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 Callott, 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 Kuffel completed the volume of his works, which contains not less than five hundred engravings, after the death of Baur, whose "deligans," in the language of Strutt, "manifest great 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 principals, will be found in our plate of monograms.

Portrait of Don Paolo Geordino II; Orsino, duke de Bracciano, an oval, dated 1646, a rare print; a set of eighteen, of the costume of different nations; a set of fifteen of the battles of various nations, entitled "Caprici di varie Battallie," in quarto; another set of fourteen 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 Belgeique," and his principal work, consisting of one hundred and fifty plates in quarto, from Ovid's metamorphoses, published at Vienna in 1644. These are chiefly 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 Ulfic Franck was a native of Kaufbeuren, an imperial city of Suabia, born in 1603, and was particularly excellent in painting and etching small figures. He settled at Augsburg, where he died in the year 1682.

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 combat in quarto, dated 1643: "David and Abigail," and "Alexander defeating Darius," dated 1644, and both in folio.

Joachim Sandrart was born at Frankfort on the Maine in the year 1606, and began his career of art by studying under Theodore de Brie and Matthew Merian, of whom we have spoken. At the age of fifteen he went on foot to Prague, to visit and obtain instruction from Giles Sadedler, after which he placed himself under Gerard Honthorst, of Utrecht, to learn the principles of painting, with whom he travelled to England. He afterwards visited Venice, Bologna, Naples, and Rome, and received instructions from Titian, Paul Veronese, Guido, Guercino, Poussin, 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 vivdness 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, beside 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 succессors of Joachim Sandrart.

His own engravings are performed chiefly with the point, and the bét of them will probably be found to be a half length figure of the goddess Flora, after Titian; an elderly couple contemplating a Cupid in a very delicate action; and "The Death of Cleopatra," from his own composition, all in quarto.

Jacques Sandrart, the nephew of Joachim, was born at Frankfort in the year 1632, and died at Nuremberg in 1688. He studied engraving at Amsterdam under Cornelius Dantierte, and afterwards at Dantzic under W. Hondius.

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 Notiff Apelles." The bulls of Rodolphius II., Ferdinand II., Ferdinand III., and Frederic, prince of Norwega and duke of Slesvici; a half length of Hohannes Michael Délherrus, after R. Wernfels; Ernuth 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 Joachim, whom we have just dismissed, was born at Ratifon A.D. 1655, and died at Nuremberg in 1698. He studied the arts of design under his father and his great uncle Joachim; his works prove 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 deftly held in esteem. His best works are, the portraits of Elizabeth Henrietta, princes of Brandenburg, surrounded by emblems; and Silvius Jacob de Dunkelmann, both in folio, after Adam le Clerck; "The Holy Family," after Joachim Sandrart; "Aeneas saving his Father from the Flames of Troy," after Raphael, dated 1682. "Marphorus, 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 "Suecia Antiqua et Hodierna."

Suan Marie Sandrart was the father of Jean Jacques, and was born at Nuremberg in the year 1658. She studied under the direction of her father, and engraved with some ability a considerable number of plates of ornaments. She engraved also a Bacchus, with the inscription "Im-
German School of Engraving.


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 Ostade, for an account of whose merits as a painter, see the article Oostade, performed about this time some etchings, which are very justly admired for their freedom and spirit. They are not all executed in the same style, though the fame mind be everywhere 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 subsequently worked upon with the triangular point, as was the custom of Rembrandt and Worlidge. The two marks with which Ostade occasionally subscribed 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 plate, "A Dutch Wake," the plate, "Several Peasants Fighting with Knives," a small plate, lengthways, dated 1658. "The Cottage Dinner," the plate, dated 1653. All these are 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 Apellis, pingar," and the first impressions of these plates 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 peasants, 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 Hatch, blowing a Horn," the plate. "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 prince Rupert for the honour of the invention of mezzotinto. The lieutenant-colonel was born in the year 1620, and, according to the baron Heinneckin, executed in that manner a portrait of the princess Amelia Elizabeth of Hesse Cauffel, 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 Francois Ermelo, 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 1693. He studied under J. Holzmann and Jean Bot, and the following plates, consisting 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 monumens 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 1621, 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 Christopher Benden, in 4to. Carolus Sulzer, Adolphus Zobellius, Andreas Winkler Johannes Michael Dillierus, after Ulricus Mayr (an highlyfinished head in an octagon border). Leonarius Weilhins, after Jos. Werner, all in folio. A set of forty-two after Ludovico Burnacini, entitled "Il Pomo d'oro," and consisting of scenic 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 Frankfurt, 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 "Seaports and Gardens of Italy," which work was published at Augsburg, A. D. 1682.

Strutt says of this artist, 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 inflances, have great merit; but his trees want freedom, lightness, and characteristical determination of their foliage; his chiaro-fuco is also pretty and fattiguing 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 Telden; some antique statues, executed entirely with the graver; and the portraits of Sebatianus Kirchmairus, public professor at Ratisbon, after Benj. Block, in 4to. Johannes Hoxius, 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, Juno Venus, and Pallas, after Elthommer, and died in her native city in 1717.

Jonas Umbach was also of Augsburg, born in the year 1624, and merits an high rank among the artists of Germany. His prints consist 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 subjects 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 etchings of "Infanticide 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.

Langel
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 1704. A pair of "Grand Landscapes," adorned with cattle and ruined buildings, and "Un Berger endormi au pied, &c." He was born at Otterdorff, in the Palatinate, in 1671, and died at Frankfort in 1681, and his matters were Julian Jardyn and Adrian de Bie.

The family of the Wolfgangos 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 Keefell, and skimped some few 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, margrave of Brandenberg, after C. Zieli, in folio, and Pierre Muller, Jurienfult, in 4to. And, in history, "A Grand Sacrifice to Diana," after A. Schoenfeld, and "Saul consulting the Ghost of Samuel," after Jof. Werner, both of the folio size.

Andreas Matthew, the son of George Andrea Wolfgang, was born at Augsburg in the year 1662, and died in the same city in 1735. He studied the elements of design under the direction of his father; but embarking for England with his brother, precipitously at some point 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 Andre 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 Buttner, bishop of Frankfort, and Christophor 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 Matthias, 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 elector Frederick William, after Jacobi's equestrian statue in bronze, is deftensively held in most esteem, though, in most of his portraits, the figure 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.

Guillauus Andrea Wolfgang was the son of Andrea Matthias. He was born at Augsburg in the year 1692, 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 figure is engraved chiefly in dots, are those of M. Francois Reyter, admiral pour l'Armee navale Angloise en Afrique. Wolfgang Jacobs Sulzer, Reipublice Augustae Decemvir, after G. Eichler, and Carl Freyher von Stien in small folio.

Jean Jacques Thurneis, or Thurneisen, was born in the year 1736 at Basle, 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.

Thurneisen was a man of a robust frame, vigorous mental powers, and extreme professed audacity. His monument 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 Mellan, have been most admired, though, perhaps, not most justly. He also occasionally imitated the square croffings of F. de Poilly.

His son, Jean the younger, worked in imitation of his father, but was less successful. The best engravings by Thurneisen the elder are, the portraits of Laurentius Scotus, after Luc Damarat, dated 1661. Francois Tur-utein, after P. Haud. Petrus Weronfus, prefect in the academy of Bale, after L. F. Wettelin, engraved of the folio size, (by the Thurneisens, father and son,) 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 Bilancia Politica del Boccacini." 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 Melan, for Sandreit's academy.

Francois Ertinger was born at Wyl, in Swabia, 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 lift 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 Cana in Galilee," a large folio, after Raymond le Paget. A set of ten, from the fac-simile of the History of the Counts of Thoulouse. A large folio, of a Boccaccian subject, after N. Poutlin; and the portraits of Nicholas Machiavel of Florence, the celebrated political philosopher, in 8vo. Gabriel de Pinaco, Jurconfult; and Jean Ferdinand de Boucham, bishop of Anvers, after F. de Cock; both in folio.

Gerard Lairesse was born at Liège in the year 1640, 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 fearlesss hand of a painter who has other objects in view than the graces or blandishments of manual execution. His chiaroscuro 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 Ballan observes, 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. Vilicher.

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 the design of Joseph
GERMAN SCHOOL OF ENGRAVING.


The prints of Lairetse 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 Bottschild was born at Sangerhausen, in Thuringia, 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 freece painting is attested by his picture of "The Defecent from the Crofs," in the church of St. Martin at Halberstadt, and by several paintings which adorn the castle 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'Entendance!" "Le Don de la Science!" "Le Don de la Sagefle!" "Le Don de la Force!" in 4to. A set of the four parts of the day, with Latin inscriptions. A pair of emblematical subjects, intituled "La Foi et la Paix!" "La Foi et la Charite!" ovals, in 4to. "Ulyses and Epius," and a subject from the Life of Hercules, both of the folio size.

Elias Hainzelmann was born at Augsburg in the year 1640, and died in the same city in 1693. He studied engraving at Paris in the school of Francois de Poilly, 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 selection: "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 Saviour. 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 Sebastian Bourdon; and two others of the same subjects, from the same painting, in one of which the infant St. John presents a lamb, and in the other an apple, to Jesus Christ. St. Francis, after Domini- ciniano. "The Noli me tangere!" or Christ in the garden, approached by Mary Magdalen, after Albano. "The Madonna and Child!" after Raphael. "Jesus Amabilis!" Mater Amabilis; St. Regard; all of the folio size.

His belt portraits are those of Francis Xavier, of the fraternity of Jefuits; George Philip Rits, after Ulric Mayr; Marcus Habern, and Juliana Benedicta Winkelrin, after the same. David Thomas ab Hagelsein, after de Neve; Agnes van Schoenbergen; Godfried Eggerus; Gabriel Willet; John Jacob Hailer, after D. Savoy, all in folio, and Johann Christoph ab Aedelmannsehlen, after C. C. Kretzschmann, in very large folio; the head, the size of real life.

Jean Ulric Kraus, or Kraffef, was born at Augsburg A.D. 1645, and died in the same city in 1719. He was the disciple of Melchior Kufell, and married Jean Sybille his daughter, and became a close imitator of the works of his contemporary Le Clerc. But all followers are meedily behind. Though Kraus copied Le Clerc's life of Chrift, which consists of fifty subjects, it is sufficiently obvious that they are not 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 less graceful, and far less well drawn. He frequently enriched his back grounds with architecture, which he appears to have well understood, and his chiaro-curo is often judiciously disposed, and his general effects good.

The cypher with which Kraus uniformly 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 fifty subjects copied from Le Clerc's life of Christ, in 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 feaons, and the four elements, desiged 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 Guillaume d'Amling, or ab Ambling, was born at Nu- remberg A.D. 1654, and died at Munich in the year 1702. He studied under F. de Poilly 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 head 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 those of Maximilian Emanuel, electoral prince of Bavaria, after T. Macolinus Muficus, dated 1670, a rare print. Maximilian Emanuel, elector of Bavaria, after J. B. Champigne, both in folio, and the latter esteemed one of his very best performances. An equestrian figure, also of his patron, and Henrietta Maria Adelaide, duchess of Bavaria, after Dela- monce, dated 1675, in 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 Otto and Louis of Bavaria, from the tapestries in the castle of Munich, which were executed after P. Candido. Another set of nine in folio, from the same tapestries, representing perforinations of the months September, October, and No- vember, the four Seasons, Morning, and Night.

The family of Meyer Baurifeld as artists, and chiefly as engravers, through two centuries. Joachim was born at Strakburg early in the sixteenth, and distingifhined himself by engraving a set of sixty-two prints of combats with the sword.

Andre was a native of Zurich, and engraved several views of
GERMAN SCHOOL OF ENGRAVING.

Battles, more his of folio fet. Another Chrifian
at himfelf, the fame, and in the other plates, 
which are chiefly portraits, with himself, and others
in mezzotinto, and coniparifon artills
of fonnet, and his principal work of engravings is a
the fame city, and of the fame family, of the illustrious perfonns of Switzerland.
the cuts for an edition of Erafimus's Praife of Polly. A fet of five, which are termed a
A 17, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.
Rodolph, and Conrad, Meyer were the fons of Dirick.
the cuts for an edition of Erafimus's Praife of Polly. A fet of five, which are termed a

Another Chrifian
at himfelf, the fame, and in the other plates, 
which are chiefly portraits, with himself, and others
in mezzotinto, and coniparifon artills
of fonnet, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.

A 17, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.

Another Chrifian
at himfelf, the fame, and in the other plates, 
which are chiefly portraits, with himself, and others
in mezzotinto, and coniparifon artills
of fonnet, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.

A 17, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.

Another Chrifian
at himfelf, the fame, and in the other plates, 
which are chiefly portraits, with himself, and others
in mezzotinto, and coniparifon artills
of fonnet, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.

A 17, and his principal work of engravings is a
of portraits of the illustrious perfonns of Switzerland.

Jean Meyer reigned about the fame time, or a little earlier,
at Nuremberg, but is premature by Strutt to have been of the fame family as the preceding. He etched, among other
plates, a fet of battles in a flight but spirited fyle, from his own compositions.

Felix Meyer was more celebrated. He was born at
Winterhull, in Switzerland, in the year 1623, and died at Weyden in 1733; his genius developed itefelf at Nuremberg,
whilet fudyng under F. Zermel, a celebrated painter of landscape, to which he afterwards added the fludy of nature. His etchings are defervedly held in esteem among connoif-
leurs, for the freedom and intelligence which they display, combined with effective chiarofuro. The moft important
of thefe are, a fet of twelve, ornamented with ruined edifices and rocks, &c. Another fet of four of the fceenery of Swit-
zerland, with ancient monuments and figures, dated 1701. Another fet of four of the fame kind of fubjects, and an-
other fet of the fame number, of a more wild, mountainous, and rocky character, all of the 4to. dimensions.
Joachim François Beich, or Beich, was born at Munich in
the year 1655, and died in the fame city in 1748. He
studied the principles of defign under his father, who was a painter of Zurnberg, but domiciliated at Munich. They
both painted landscafe and battles, and Joachim travelled to Italy for improvement, where he refided for feveral years,
contemplating the fceenery of that claffical landscafe country, and the works of Gafpar Pouflin and Salvator Rofa.

On his return to Munich, he took up the etching point with succefs, and produced several fets of plates of landscafe fce-
enery in a grandftyle, among which the principal are, a fet of eight mountainous landscafe from his own compositions, in
4to. Another fet of fix. Another fet of fix with rocks,
cataracts, and banditti, in the style of Salvator Rofa, of the folo size.

George Philip Rugendas of Augsburt was born in the
year 1666. He learned drawing of Isaac Etcher, 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 refided Augsburt in the
year 1695. At this time the war of the Spanish suc-
cellion was raging in Germany, and our artift had oppor-
tunity to contemplate its effects, and draw battles, skirmilhes,
and fages, from nature. Among thefe the bombardment and
taking of his native city by the French and Bavarians, formed
an infterting fubject for his pencil and etching needle, and
he published in fix prints, their military operations in that
neighbourhood during the years 1703 and 1704.

Rugendas defervedly holds a diffinguifhcd rank among
batttle painters. His defigns 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 jufly admired.

Besides the pictures from his hands, which are not uncommon in the galleries and cabinets of Germany, Rugendas has performed a confiderable number of etchings and plates in mezzozinto, of which the fubjects are chiefly hunting and battles; fome by himfelf, and others in conjunction with his fons, of whom he had three that were educated to the arts.

We begin our lift with a fec tion from his etchings; a fet of fix of "Capricie de Giorgio Filippo Rugendas," dated
1698. Three fets of "Cavilers Marching, in Action, &c."
contifling of twenty-two plates, in 8vo. A fet of very
capital etchings, in folio, of "Les Operations militaires
de Francois et des Bavaros a Augbourg et a Bes Environ," dated 1704.

His belt mezzozintos are, "A Colonel of Huffars on
Horfeback." A fet of four, of "Combats between Hun-
garian and Prufian Huffars." A fet of four, "Hunting
Pieces." A fet of four, "Battles, &c. in the Turkift
Campaign." Another fet of fix, entitled "Les Operations
et les Occupations militaires," &c. all in folio.

The following were produced in conjunction with his fons:
A pair of "Mountainous Landscafe," in 4to. A pair of
"Combats between Cavalry." A fet of four, of "Marches
and Halts." Another fet of four, of "Camps and Skir-
milhes," all in 4to. A fet of fix, of "The Amufements of
the Camp." Two fets of Battles, confifling of fix
in each. A fet eight, of "Marches, Halts, and Combats
of Cavalry," all in folio; and a fet of twenty of various
military fubjects, in 4to.

Jaques Chrifophle le Blond, or Blon, an engraver in mezz-
zinto, was born at Frankfort in 1670. He travelled to
Rome in the year 1696, in the suite of the imperial ambaff-
dor, where he fudyed painting under Carlo Maratti,
but having been of a mechanical turn, he entered with
warmth into various [precautions; at length he learned to
perform mezzozinto, and difcovered a method of printing mezz-
zinto plates in colours. The Dutch painter Overbeck
perfuadcd him to bring his new discovery to Amsterdam, from
whence he emigrated to England.

Eagerly bent on the execution of his new project, he ex-
cuted in London feveral large plates in mezzozinto, from
pictures by the greateft masters, and difpofed of the prints
by lottery; but thofe 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 thefe
plates, in a book entitled "Colorito, or the Harmony
of Colours in Painting, reduced to mechanical practice,
under eafy precepts and infallible rules," which were printed both
in Engliih and French: but nothing is more common than
the failure of infallible pretenfions, 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 suc-
cceed.

He afterward let on foot a fcheme for copying the Car-
toons of Raphael in tapeftiy, and made drawings for that
purpofe; but though money was fubfcribed, houfes built,
and looms erectcd at the Mulberry-ground, near Chelsea,
this project alfo failed, and poor le Blond, to the no small

dif-
artift 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 obfervation enough to
discriminate between two or more fets of features; and perfons
vanity and courfily pomp enough, to court at the means of
attaining a certain fpecies of perifhable popularity.

We have paffed lightly over engravers of this inferior de-
scription, and fome we have entirely omitted, as they con-
tributed nothing toward the advancement of art, but rather
perhaps retarded its advancement.

From these men of mediocritv, attention turns with plea-
sure to the contemplation of the extraordinary powers of
Jacob, or Giacomo Frey. Frey was born at Lucerne in
Switzerland, in the year 1681, and his life presents a curious
instance of the infalphatibility of genius, which it should
seem that no rigour of adverse fortune can fubdue, and
no ftre of intermperate affections can conftume.

He was apprentifed to the trade of a cartwright, and in
fpite of his propenfities towards the fine arts, was obliged
to follow that trade till he attained the age of two and twenty,
when he fomehow or other made his way to Rome; but in
quitting the pefculian and placid valle of Lucerne, he feems
to have taken leave of all fober restraint, and on his ar-
ival in Italy, his paffions, which had hitherto been held in
check, hurfied him into every dangerous excefs. Yet, as
the fame Po, which roars and rifs in the Alps, winds
afterward a flaty river, through the plains of Italy, fo it
was with our artift: when the ebullition of paffion was
over, he fent with delight to the advice of Arnold van
Witlenhout, and the inftructions of Carlo Maratti, and from
that period began to make furprifing prorogres in the art
of engraving.

A speech of Maratti to Giacomo Frey, which fo strongly
marks his good fenfe and obfervation, has been recorded:—
"The engravers of history (fai this) make too much ufe of the
burin, and hence afford a certain hardnefs in the contours,
from which, however, the beft prints of Doriy are com-
paratively free. I would advise you to familiarize yourfelf with
the etching point, becaufe it operates in a far more picturesque
manner than the graver."

Frey followed this advice. Robert van Audenarde was
at this time his fellow-difcipline and liberal rival, but the rapid
 strides of our artift foon left him at an immens diftance,
thana man of ability. He drew with superior taste; had
a fine eye for the harmony both of colours and chiarofcur;
etched with a degree of spirit and freedom, which have very
rarely been attained; worked over and refined his etchings
with the graver, at once with Minute and facility; incor-
porating the whole by means of fuch exquisite feeling of the
merits of his original, that it has been emphatically faid of his
prints, that they appear rather printed than engraved. He
was the Gerard Audrain of Italy, and femeied only to dif-
fer from Audrain himfelf, as Raphael, Guido, Dominichino,
and Guercino, (after whom his principal works are engraved,) differ from Le Brun. In fhort, his feeling for the pecu-
lar excellencies of the fpiritual mifters of the Italian fchools was
of the highest and pureft kind; fo that it may be faid, almost
without a metaphor, that in his engravings their forms ap-
pear revivified by the spirit of Giacomo Frey. He died at
Rome in the year 1752, the adoration of every intelligent
artift, yet before he had received more than an earn of the
prizes that were juftly his due.

It is to be regretted, that when his plates, which were
published by his son Philip, began to wear, they were in-
judiciously retouched, perhaps by Philip himfelf, who de-
stroyed all his father's fweetnefs and harmonious mellownefs;
fo that good impressions of the prints of Frey, in their ori-
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Bernard Vogel was the conducer of Heifs, some of these very large plates being engraved by them in conjunction. He was a native of Nuremberg, born in 1663, but resided chiefly at Augsburg, where he espoused the daughter of Heifs. 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 1737, leaving behind him a son, Jean Christophe, who engraved several plates in mezzotinto, after Kupetzky.

The best works of Bernard Vogel are the portraits, performed with the graver, of Johann Michiel Weckmann, after L. C. Eichler; Augustan Hermann Frankius, professor of theology; and Johannes Michael Welfer, senator of Nuremberg, after J. C. Hirchelmann, all in folio.

The chief of his portraits in mezzotinto, are those of Johannes Kupetzky, painter, dated the year of our artist's death; Michael Gottfried Wittber, a celebrated surgeon, after Kupetzky; and George Bledinger, the painter, all in folio.

Christopher Vogel engraved, in the same manner, the portrait of his father, inscribed "Chalcographus Norib." Jean George Bergmuller was born at Dircheim, in Bavaria, A. D. 1687, and died at Augsburg in 1752. He learned the rudiments of art under Andrea Wolf, 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 composed, and in very large folio. "The Raising of the Cross." "The Assumption of the Virgin." "The Adoration of the Kings." "An Ecce Homo." "The Crucifixion." "The Death of Amasis." "The Dispute between St. Paul and the Philosopher s.
fophers of Athens." And "The Judgment of Solomon;" all in very large folio. "The Coronation Procession of Queen Maria Theresa at Pr€ubourg;" also of very large dimensions.

Jean Edme Ridinger, a very distinguished engraver of animals, was born at Ulm in the year 1695, and died at Augsburg in 1757. His father was a reputable drawing master, and from him our artist received his earliest instructions in the art. He afterwards studied painting under Christopher Reisch, but as an engraver studied nature alone, and was one of her successful votaries. He formed a style of engraving animals for himself, which consists 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 wilds 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 untrodden forests, and occasionally in his dens of bears, tygers, lynxes, &c. the most barren and desolate rocky solitude, insomuch 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 dangers 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 historiall, being representations of chases 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 beneath these engravings there is generally a particular description, or history, of the chase, in the German language. He did not, however, draw the human figure, nor that of the horses, with equal ability; though his chirotonsos are 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:

"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 "Beasts feeding on a Stag," and a haunted "Wild Boar in a Forest," are of especial value to connoisseurs. 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 Tusk," and "The Stag in Rutting-time," dated 1755 and 1757, taken by the duke and duchess of Wurtemberg. A set of sixteen hunting pieces of the larger and smaller game, as practised in the different states of Germany, with German and French explanations beneath, rich and interreling 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 Preillers were a numerous family of engravers, whom we shall pass with brief notices, as they rarely rose above mediocrity.

Jean Daniel Preiller, 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 1698, and died there in 1775. He resided in Italy a considerable time, and became director of the Imperial Academy of Augsburg. His most distinguished works are "The Apotheosis of Eneas," 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, first engraved in Rome, from drawings by Bouchardon; small uprights. The etchings of the Jesuits' church at Antwerp, after Rubens, consisting of twenty small plates, exclusive of the portraits of Rubens and Vandyke.

George Martin Preiller, 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 Preiller, was chiefly confined to book plates and portraits.

Jean Martin Preiller, 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 bell prints are "Chrift bearing his Cross," a large folio, from Paolo Veronese. "Samson, placed on the Crown of Ninox upon the Pyramis Head," by Guido, a large folio, engraved with the former, for the Dresden gallery. "A Battle," from Parrocio, and a Bacchusian subject, from Pierre, both in large folio.

Jean Alexander Thiele was born at Ehrfurth in the year 1695, and from the rank of a common soderer rose to be a distinguished engraver and painter of landscapes. A decided taste for this art, and some pictures of Agriculture, which it was his good fortune to see and copy in Dilemmer, 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 crayons, which, though an ineligible mode of art, is a proof of his ingenuity; he afterwards acquired a knowledge of oil-painting under Menyky, in which he gloried, and in which he excelled. His industry was the romantic part of Saxony, and more especially the banks of the Elbe and the Saale. 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 rude character; a set of three mountainous landscapes; a landscape of grander character; a pair adorned with ruined monuments of antiquity, in the form 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 five of superior execution, from nature, including views of Pilnitz, Konigstein, Muffen, and Dresden, dated 1726, in large folio.

Paul Troger was born at Zell, in the bishopric of Brixen, in the year 1693, and died at Vienna in 1777. He studied the rudiments of his profession in his birth-place, and afterwards
travelled for improvement to Fium, in the bishopric of Trent, in order to avail himself of the instructions of D. J. Alberti, after which he went to Vienna, and soon became known by his prints, and by the pictures with which he adorned some of the churches of Austria. In etching, the touch of Truger is firm and precise, his figures are well designed, and his expression just. He became director of the Imperial academy of Vienna, and engraved in a good taste both historical subjects and landscapes, the latter of which he ornamented with figures, ruins, &c.

His best prints are two small Holy Families; "The Virgin and Child;" "St. Joseph carrying the Infant Christ;" "The Virgin in Grief, comforted by Angels;" in folio. Five small landscapes. And a pair of landscapes, in which ancient monuments are introduced, in quarto, dated 1724.

Jacob Maenli was born at Vienna in the year 1695, and died in the same city at an advanced age; and, according to the baron Heinmeck, was a mezzotinto engraver of considerable ability. He was employed by C. Luech, inspector of the Imperial gallery at Vienna, to theft the celebrated collection in mezzotinto, and had executed thirty-one of the plates, when the death of both the engraver and employer put an end to the completion of their project. Maenli, of these thirty-one prints, only eleven were ever made public; the rest are preserved to have been sold by the heirs of Maenli, and are now missing. At the head of the work is a portrait of the emperor Charles VI., and Heinmeck and Strutt have given life of the subjects engraved.

Antoine Joseph Prener, or Von Prener, after the death of Luech and Maenli, undertook, in concert with Stempart, Altomonte, Schmutzer, and others, to recomplete the work from the Imperial gallery, and after a considerable lapse of time produced "Theatrum Artis pictorice, quo tabula depicta quae in Caesarea Vindobonensi Pinacotheca servatur," &c. in four folio parts, or volumes, of which part one was published in 1728, part two in 1729, part three in 1731, and part four in 1733.

These four parts contain one hundred and sixty prints, which are surrounded by borders in a bad taste, and the work altogether is but of mediocrib character. The best portraits by this artist are those of Jean Gottfried Auerbach, painter to the emperor Charles VI., and count d'Ourt, governor of Vienna, both of the folio size.

Gaspard von Prener, the son of Antoine Joseph, was also an engraver, who travelled to Italy for improvement, and was engaged in engraving the "Museum Florentinum." He also produced a set of fifty-four etchings, neatly finished with the graver, of historical subjects from Taddeo Zucchetto, and other distinguished painters, dated 1746.

G. A. Muller was born at Vienna some time about the commencement of the eighteenth century, worked in a delicate style, and, in concert with the Schmutzers, produced Rubens's series of the history of Decius, of which Muller engraved two.

His other principal works are the portraits of Philippe Louis, count de Sintzendorf, after M. Altomonte; Jacob van Schuppen, member of the academies of Paris and Vienna, after a picture by himself. "The two Children of Rubens at the age of adolescence," from a celebrated picture by that painter, in the Lichtenfein gallery.

The brothers, Jean Adam, Joseph, and Andrea Schmutzer, were natives of Vienna, and born about the close of the seventeenth, and beginning of the eighteenth centuries. They died, the former in the year 1739, the two latter in 1742.

Their grandfather, a general in the Imperial service, lost much of his property by the accidents of war; and the infidelity 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 elder, 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 Elenora, Amelia, and Elisabeth.

Joseph and Andrea generally, if not always, worked in concert, and affixed their names, sometimes Joseph and Andrea, and at others Andrea, and Joseph Schmutzer, with brotherly alternation. Josephpossessed dexterity both in etching and engraving, 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 Borel, and Van Dalen. The best prints from the gravers of these brothers are the portraits of the emperor Charles VI. on foot, after M. de Meyten; the empress Elizabeth Christina, after J. G. Auerbach; Gustavius Adolphus, baron de Gotter, Prussian minister of state; and Leymann, a librarian, or bookfeller, 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 Lichtenfein.

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 poor as to be 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-pen, and his love for art often induced him to confide his flock to some indolent country lad, whilst he flew 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 effays in engraving, solicited the prince Kaunitz, 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 masterly intelligence.

He was now recalled to Vienna, with high rank in his profession, and was named by Maria Therefa 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 Delfains, and Joseph von Sonnenfelst, both small; Martin de Meyens, the celebrated painter, after a picture by himself, dated 1756; C. G. E. Detvcry, another celebrated artist, after the same, dated 1765; Joseph Wenceslaus, prince of Lichtenfleins, after V. Fanti; the emperor Francis I., after von Lichtard, dated 1769; the companion to which is the engraver Maria Theresa, 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 Tefchen, dedicated to madame the archduchess; "Mutius Saxov before Porteum," from a picture by Rubens in the cabinet of the prince Kaunitz, dated 1758; "St. Gregory refusing to admit the emperor Theodolus 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 Neulawde and Dornbach, in which occurs the tomb of Roffenc, 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 Talle, (fays Huber,) proclaimed him an artist. His perseverance, after various strugles, 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 Bucbing at Berlin, from whence his ambition was furthered, rather than his purvue, in the year 1736, carried him to Paris, where he frequented the school of Nicholas de Larmeflin, who honestly and earnestly seconded the professional wishes of Schmidt, by imparting to his disciple all that was possible to him, 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, Prieler, and Ville (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 they reigned between them a noble professional emulation. Schmidt had recommended himself to the friendly regard of the celebrated Rigaud by the very fine portrait of F. 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 for to Petersburg 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 1752, he began to delineate 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 into 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 Craven published a catalogue raionné 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.—Confinante Scarlatti, prince of Moldavia, a rare and fine print, dated 1738; Charles Gabriel de Tubieres de Caylus, bishop of Auxerre, after Fontaine; Louis de la Tour d'Auvergne, count de Evreux, after H. Rigaud, dated 1742; Johannes Baptista Rosseau, after J. Aved, dated 1749; Charles de St. Alvin, archbishop of Cambrai, after H. Rigaud, dated 1743; Maurice Quinten de la Tour, from a picture by himself, dated 1743; Jean Baptiste Silva, a celebrated physician, after Rigaud, dated 1743; Pierre Mignard, first painter to the French king, after his friend Hyacinthe Rigaud, engraved in 1744, for Schmidt's reception into the academy, a piece regarded by connoisseurs as a chef d'œuvre of the masters, and the finish of which is engraved 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 Antonio Peine, first painter to the king of Prussia, and Samuel Baro liber de Cocceii, both in folio, dated 1751 and 1752, and reckoned among the best portraits from the graver of Schmidt.

Johannes Theodore Eller, auflie-councilor, &e. after Peine; and Louis Albertene de Brandt haron de Grapendorf, after le Sucur, are a very rare and beautiful pair of portraits of the folio size.

Among the best portraits which our artifll engraved at Petersburg, are those of Michel de Woronzow, count of the Holy Roman empire, and Nicholas Elterhazy de Galantha, both in large folio, after L. Toque, and dated 1758; Pierre Comte de Schuallow, grand-master of the Prussian artillery, from the life, and dated 1760; the engravings of Elisabeth of Ruffia, a whole length figure, with accompaniments of the imperial costume, after L. Toque, which Huber calls a superb print, more especially for the execution of the accessories parts, it is dated in 1758; Count Cyrilus de Rafumovizky, after L. Toque, and Jacobus Mounney, from a picture by Schmidt himself, dated 1760, are rare and beautiful, and M. de Katt, field marshal and minister of ficate to the king of Prussia; the last portrait from the graver of Schmidt, the head in which is by himself, but the rest finished by Berger 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 Larmeflin at Paris; "Tahage Flamande," &c. in folio, after Oladie, engraved in a style resembling that of Viffcher, and dated 1757; "The Virgin Mary fitting with the Infant Christ and St. John," after Vandyke, dated 1753; "The Virgin at Prayers," after S. Ferrata; "The Presentation in the Temple," after Pietro Teila, for the Imperial gallery at Petersburg; "Alexander and Philip the Phycian," after Ananbail Carracci, engraved in imitation of the historical style of Gerard Audran, at Berlin 1769, and "Timoleon 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; built of an Oriental in the style of Castiglione, dated 1753; built of a young man in a Rem-
German School of Engraving.

Among the most esteemed of his historical works are: "The Infant Christ asleep in a Landscape," a beautiful print, "The Education of the Virgin," "The Prophet Jeremiah," "Tirielas" and "The Holy Family," which are among the finest achievements of the artist.

Joseph Wagner was born on the 17th of September 1756, at Thalendorf, on the lake of Constance, and died at Venice some time about the year 1793. He was the pupil of J. Amiconi, 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 in Berlin in 1771, is a fine work of his hand.

Wagner was a pupil of J. Amiconi, 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. In 1756 he settled at Venice, and published there the engravings of himself and pupils, and finally established a successful commerce with several parts of Europe. Among his disciples were Flipart, Berardi, and, above all, Bartolozzi, whose talents have been reduced to his master, to him, to Italy, and to England, and who still live in engraving in Portugal amid the din of arms.

Wagner's engravings are particularly easy and engaging, and in this sense, what we term admirable. It is built on the firm foundation of sound drawing, and partakes highly of the merits of Gerard Audran and Giacomo Faro. 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 masters after whom it was his fortune to engrave.

The elements of his style are vigour tempered with mildness andfacility; hence he is celibately bold, and, without the least appearance of labour, produces, in his best works, an effect of finishing, which others 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 Cyclopaedia, that honour must 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 empresses Anna of Russia, and Peter the Great, executed by Minerva. The empress Elizabeth Petrovna, with a Russian inscription, and Farinelli crowned by the Muse of Harmony; all in folio, and after his first master, Amiconi.

Among the most esteemed of his historical works are: "The Infant Christ asleep in a Landscape," a beautiful print, "The Education of the Virgin," "The Prophet Jeremiah," "Tirielas" and "The Holy Family," which are among the finest achievements of the artist.
ployed, 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, Mannheim, Munich, and Stuttgart; which have produced the Stamitzes, the Tounich, Canabichs, Schreeters, Haydn, and innumerable other symphonists, whose compositions are known to all lovers of music. All these different symphonists (says 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 equally equalled the most eminent Italian dramatic composers of the last century; such as Hasel, Taffi, Graun, J. C. Bach, Millesseweeck, Gluck, Naumann, &c., without mentioning the orators, and maestres 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 best style of composition.

GERMAN, in Geography, a township of America, in Fayette county, Pennsylvania; containing 1855 inhabitants.

GERMAN Flats, the chief and post-town of Herkemer county, in the state of New York, situated on the N. side of Mohawk river, opposite to Herkemer, and 22 miles E. of Whitesville; 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, containing chiefly of High and Low Dutch, and contains about 200 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 flockings, 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 Methodists, and the parent of that in America, subsists in this place. A severe battle was fought here between the English and Americans in October 1777. — Also, a post-town, and capital of Stokes county, N. Carolina, situated near the town fork of Dan river, and containing a court-house, gaol, and about 100 houses; 528 miles S.W. by S. of Philadelphia. — Also, the chief town of Hyde county, in Newbern district, N. Carolina. — Also, a town of

Bracken county, in Kentucky, containing 81 inhabitants — to, a town of the state of New Jersey; 17 miles W.S.W. of Morristown.

GERMANTOWN, in Botany. See TUSCERUS.

GERMAMER, in the Materia Medica. The common germander, teucrium chamissoi, of the chamerdy minor genus, 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酒tinctures. The chamerdy has been chiefly esteemed in the character of a mild aperient and corroboration; it is recommended in uterine obstructions, interrupting fevers, and in the rheumatism and gout. The good effects of the chamerdy in the latter disorder are recorded by different authors who have employed it in various forms and combinations, of which the celebrated antispirite, or Portland powder, is an instance. According to Murray the virtues of this plant should be nearly allied to those of Marrubium; and therefore it promises to be useful in anaphylactic affections, coughs, and infarctions of the lungs. The virtues, however, are somewhat problematical.

The Marum germander, or Syrian herb mastic, teucrium marum, flowers from July till September. It is a native of Spain, and is said to grow plentifully also in Greece, Egypt, Crete, and Syria. It was first cultivated in England by Parkinson in 1649, 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 acrimony. According to Lewis (Med. Hort.) it loses but little of its pungency by being dried and serves out its active matter partially to water, and completely to rectified spirits. Dried with the former, it yields a highly pungent, subtile, volatile, essential oil, similar to that of coryn-gratia, but stronger and of less perfidious pungency. Rectified spirit carries off, in the impregnation 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 tailed, 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 stimulant, aromatic, and deodrant quality; and instances of its efficacious use have been adduced by Linneus, Rofenlein, and Borgius. At present, however, marum is here chiefly used as an orrhine, and is an ingredient in the "publis cactiv compositus" 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 foerdium, is a native of England, in marshy situations, and flowers in July and August. The leaves of foerdium have a smell resembling that of garlick, whence its name; and to the taste they are bitter, and slightly pungent. When moderately and newly dried, they give out, says Lewis (Med. Hort.) their smell and taste both to water and to rectified spirits. In dilution their peculiar flavour abides, with weak, but the impression of the distilled fluid is not strong, nor could any essential oil be obtained onsubmitting to the operation of several pounds of the herb. The ancients attributed to foerdium a peculiar antispirent and alephaphrnic power, and it had for many ages the character of being remarkably efficacious in all putridal 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 infecccions;
fections. But, notwithstanding this celebrity, it appears to be a very insignificant article of the Materia Medica, and is therefore very justly fallen into disuse. Bergius, however, states its virtue to be "antiputredinosa, tonica, diuretica, diuretica, relutens," and some others recommend it to be employed externally in antipticc eataplasms and fomentations. Woodville Mat. Bot.

**GERMANDER, Rock.** See *Veronica.*

**GERMANEA, in Botany,* named by Lamark after Mont. de Saint-Germain, a great admirer and cultivator of plants. Lamark Díct. v. 2. 499. Illuftr. t 514. Jufl. 116. 449. See *Plectranthius,* which latter appellation, given by L. Heritier, who was partial tother to M. de Saint-Germain nor his admirers, has been universally adopted.

**GERMANIA, in Geography,* a polls-town of Culpepper county, in Virginia; 82 miles from Washington.

**GERMANICIA, in Ancient Geography,* a town of Afa, situated on a plain between mount Taurus and mount Amansos, on the bank of a small river which ran into the Tyrannus, W. of the town.

**GERMANICOPOLIS,* a town of Ethunya, near the Propontide, called by Pliny Helgas and Boos-Cate — Alfo, a town of Paphlagonia, called Gangra. — Alfo, a town of Hauria.

**GERMANICUS, Caesar,* in Biography, grand-nephew of Augustus, nephew of Tiberius, and grandson of Livia. When Augustus adopted Tiberius, he obliged him to adopt Germanicus, who thus, according to the Roman law, stood in the filial relation to them both. Germanicus 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 affection of the public, on account of the excellence of his temper, and the mildness of his disposition, and was denominated the "delight of the Roman people." Germanicus 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 affection of the soldiers unanimously saluted him emperor. He refused the honour, and then appeased 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 Caesar," but this subjugation was only a temporary cessation of the contest, and, upon some defeat experienced by the Romans from the elements, the Germans renewed their attack, which afforded Germanicus 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 confute. On his return he was honored with another triumph, which was celebrated with extraordinary magnificence. That part of the spectacle which was most affecting to the Roman people, was the harangue of the victor, filled with his three sons and two daughters. Germanicus was soon sent into the East to quell some disturbances there; the powers entrusted to him on this occasion were very extensive, but the auspicious Tiberius had placed Pife as a spy and check on the illustrious general. Germanicus entered upon his second confutehip, 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 Lesbos, thence he touched upon Thrace, and crowning into Asia, viewed the ruins of Troy, and consoluted the oracle at Colophon. Pife hastily followed him, and after terrifying the Athenians with a severe harangue, and throwing out inflations against Germanicus, embarked for Rhodes, where he would have perished had he not have been favored by the humane affiffance of the prince, whom he overtook there. Germanicus now proceeded to execute his commission. He placed the banner on the head of Zeno, son of the king of Pontus, an ally of the Romans. He then reduced Cappadocia and other places to the state 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 Pife 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 Germanicus was attacked with a disease which afterwards proved fatal, and which was imputed to the effects of poison, but some of our best historians, having impartially examined the collateral facts, do not think the evidence sufficient to justify the allegation. Germanicus himself had no doubt that he was the victim of the malignity of Pifo, and, in his last moments, conjured his friends to prosecute with the utmost vigour the authors of his death. He died at Ephesius, 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, flung up their houses, and affirmed 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 Univer. Hist.

**GERMANO,** in Geography, a town of Naples, in La- vora, containing four parishes, four convents, and about 800 perions. Near this place are the ruins of "Custium," destroyed by Theodoric, king of the Goths. The town is situated 43 miles N. N. W. of Naples. N. lat. 41° 33'. E. long. 13° 45'. — Alfo, a town of the duchy of Urbino; 13 miles E. N. E. of Urbino. — Alfo, a town of France, in the department of the Sefa, late in the lordship of Verelli; four miles E. of St. Ina. — Alfo, a town on the W. coast of the island of Porto Rico. N. lat. 18° 20'. W. long. 67° 40'.

**GERMANS,** so called from the name of their country, in Ecclesiastical History, one of the sects of rigid anabaptists into which the Flemingians were divided; the other two being denominated Flandrians and Friedlanders. See Flemingians.

**GERMANS, St. or Germanus,* 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 Levisius translated it to Crediton, in Devonshire, in 1049. King Athelstan founded a priory for secular canons here; to which the cathedral buildings were annexed. Of these nothing remains
In ancient times Germany was inhabited by various nations, which the Romans, with whom they waged war for some centuries, considered as Gauls. Of these the Helvetii, Boii, Tecteophagi, and Gothi (see Gorbits, &c.), and the Teutones, who dwelt in the Simus-Godanum near the Cimbri, were among the first that crossed the Rhine, and applied to themselves the name of Germani, probably from the Teutonic word Gier or Guer, a sword, alliterating, as it were, their quality of warriors. The word Guer or Gier, 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 Teufeland, and latterly Deutschland. (See Teutones.) The French gave it the name of Allemagne from the Allemanni, 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 edict of Nantes.

Buoching states the extent of Germany at 13,724 German square miles, 15 to a degree; but professor Crome of Gieffen, 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 Eider, 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 seventeen provinces of the Low Countries, having been detached from the empire, it latterly contained only nine circles, viz.

1. The Circle of Austria, which comprised, 1, the arch-duchy of Austria proper; 2, the duchy of Silesia; 3, the duchy of Carinthia; 4, the duchy of Carniola; 5, the Austrian Frioul; 6, the Lithuanian; 7, the territory of Triest and Tiume; 8, the county of Tyrol; 9, the bishopric of Trent; 10, the bishopric of Brixen; 11, the commandaries of the Teutonic order in Austria, and on the Etzch; and 12, the lordship of Trapez, belonging to the prince of Dietrichstein.

II. The Circle of Westphalia, which comprised, 1, the bishopric of Munster; 2, the bishopric of Osnabruck; 3, the bishopric of Paderborn; 4, the bishopric of Liége; 5, the abbot of Corvey; 6, that of Stablo and Münster; 7, that of Werden; 8, that of Cornelius Muller; 9, that of Essen; 10, that of Thorn; 11, that of Havelburg; 12, the duchy of Cleves; 13, the duchy of Juliers; 14, the duchy of Berg; 15, the principality of Münster; 16, the principality of Verden; 17, the principality of Nisian; 18, the principality of East Friedland; 19, the principality of More; 20, the duchy of Oldenburg; 21, the county of Mark; 22, the county of Ravensburg; 23, the county of Schauenburg; 24, the county of Lippe; 25, the county of Steinfurt; 26, the counties of Tecklenburg and Lingern; 27, the county of Bentheim; 28, the counties of Münster and Liége; 29, the county of Hoya; 30, the county of Diepholz; 31, the county of Wieda.
111. 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 Trèves; 3, the electorate of Cologne; 4, the palatinate of the Rhine; 5, the principality of Aremberg; 6, the county of Lower Lorraine; 7, the burggrave of Reineck; 8, the county or lordship of Heidelberg; 9, the commandry of the Teutonic order Coblenze. The prince of Thurn and Taxis was a member of this circle, without having any territorial possessions in it.

114. The Circle of the Upper Rhine, which comprised, 1, the bishopric of Worms; 2, the bishopric of Speyer; 3, that of Strasbourg; 4, that of Bale or Basel; 5, that of Fulda; 6, the principality of Heiligenheim; 7, the abbey of Prüm; 8, the abbey of Weißenburg; 9, that of Odenheim; 10, the landgrave of Heidelberg; 11, the principality of Hersfeld; 12, the county of Katzenellenbogen; 13, the county of Hanau-Münzenberg; 14, that of Hanau-Lichtenberg; 15, the principality of Simmern; 16, the principality of Lautern; 17, that of Veldenz; 18, the principality of Deux Ponts; 19, the county of Spornheim; 20, the principality of Salm; 21, the principality of Naiffau; 22, the principality of Waldeck; 23, the county of Solms; 24, the county of Königstein; 25, the county of Upper Hohenheim; 26, the possession of the Wald or Wild, or Rau Graven and Rhine Graves, (in Latin, Comites Saltuarii, Forclhari, Silicetres et Hirtifici, counts of Grumbach, Stein, and Dunaun; 27, the county of Leiningen; 28, the county of Wittgenstein; 29, the county of Falkenstein; 30, that of Kirchhingen; 31, that of Wartenberg; 32, the lordships of Biebrich, Dachtul, and Ohllbrück; 33, the free imperial cities of Worms, Speyer, Frankfort on the Maine, Friedberg, and Wetzlar; 34, the imperial borough of Friedberg; 35, the imperial villages of Münzfelden, Soltitzbach, and Soden.

115. The Circle of Swabia, which comprised, 1, the bishopric of Constance; 2, the bishopric of Augsburg; 3, the abbey of Eichstät; 4, the abbey of Kempen; 5, the county of Wirtemberg and Teck; 6, the margraviate of Baden; 7, the principality of Hohenzollern; 8, the abbey of Landau; 9, that of Buchau; 10, the principality of Fürstenberg; 11, the county of Oettingen; 12, the principality of Klettgau; 13, the principality of Lichtenheim; 14, that of Friedberg-Schellenberg; 15, the abbey of Salm-Aulich; 16, the abbey of Wemgarten; 17, that of Offenhauen; 18, that of Eichlingen; 19, that of Yrlce; 20, that of Urfach; 21, that of Raitersheim; 22, that of Königstein; 23, that of Rott; 24, the abbey of Weißenburg; 25, that of Schaffenrod; 26, that of Marchtal; 27, the abbey of Peterhausen; 28, the abbey of Wetterhausen; 29, that of Zwingelte; 30, that of Gengenbach; 31, the county of Hohenlohe; 32, that of Guttenzell; 33, that of Rotunfen; 34, the county of Windisch; 35, that of Bödeheim; 36, the commandery of Alschhausen; 37, the

landgrave of Stühlingen; 38, the landgrave of Baar; 39, the county of Truchseß-Waldburg; 40, the county of Königlieg; 41, that of Eberlein; 42, that of Fugger; 43, that of Hohen-embge; 44, that of Hohen-Gerlofs; 45, the county of Neipperg; 46, the county of Bondorf; 47, the lordships of Wiibenburg, Hadun, Moekirch, Tannenberg and Argen, Mindelheim and Schwabach, Gündelingen, Julingen, Eglolf, Thannhausen, Ettlingen; 48, the free imperial cities of Augsburg, Ulm, Eningen, Reutlingen, Nördlingen, Halle, Ueberlingen, Rothweil, Heilbronn, Günzburg, Mönningingen, Linzai, Dürkheim, Biberach, Ravensburg, Kempen, Kaffeburen, Welt, Wangaug, Ynsl, Leutkirch, Wimpfen, Gengen, Pfalzendorf, Buchhorn, Aalen, Bopfigen Dietrich, Offenburg, Gengenbach, Zell on the Hammerbach; 49, the imperial village of Alschhausen.

116. The Circle of Bavaria, which comprised, 1, the archbishopric of Salzburg; 2, the bishopric of Friesingen; 3, the bishopric of Ratisbon; 4, the bishopric of Paffau; 5, the principality of Berchtesgaden; 6, the abbey of St. Emmeram in Ratibon; 7, that of Halberstadt; 8, the lordships of Upper Mühlberg in the same place; 9, the duchy of Bavaria; 10, the Upper Palatinate; 11, the principality of Neuburg; 12, the principality of Sultzbach; 13, the landgrave of Leuchtenberg; 14, the principality of Steinheim; 15, the county of Ingel; 16, the county of Ortenburg; 17, the lordships of Einfelden, Salzburg, Pfyrbaum, Hofen, and Bieteck; 18, the free imperial city of Ratibon.

117. The Circle of Franconia, which comprised, 1, the bishopric of Würzburg; 2, the bishopric of Würzburg; 3, the bishopric of Eichstät; 4, the commandery of the Teutonic order of Mergentheim; 5, the principality of Coblenz, or Bayreuth; 6, the principality of Onolfschaff; 7, the archbishopric of Spire, of the duchy of Coblenz; 8, that of Würzburg; 9, the county of Hohenlohe; 10, the county of Caull; 11, the county of Wertheim; 12, that of Rieneck; 13, that of Erbach; 14, the lordships of Lorrain, Seinfheim, Reichellberg, Württemberg, and Hauen; 15, the free imperial cities of Nuremberg, Rothenburg, Windheim, Schwaben, and Würzburg; 16, the imperial villages of Goethein and Schaffau.

118. The Circle of Upper Saxe, which comprised, 1, the duchy of Pomerania; 2, the electorate of Brandenburg; 3, the electorate of Saxony; 4, the duchy of Saxe-Weimar; 5, the duchy of Saxe-Gotha; 6, that of Saxe-Coburg; 7, that of Saxe-Meiningen; 8, that of Saxe-Hildburghhausen; 9, the abbey of Meissen; 10, that 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 Walkenried; 16, the principality of Schwartzbich; 17, the county of Mansfeld; 18, the county of Stolberg and Wernigerode; 19, the county of Darby; 20, that of Hofstein; 21, the principality of Hatzfeld; 22, the county of Reus; 23, the county of Schönburg.

119. The Circle of Lower Saxony, which comprised, 1, the bishopric of Halberstadt; 2, that of Lubeck; 3, the abbey of Ganderheim; 4, the duchy of Magdeburg; 5, the principality of Halberstadt; 6, the duchy of Bremen; 7, the principality of Celle; 8, the principality of Götzenhagen; 9, the principality of Calenberg; 10, the duchy of Saxe-Lauenburg; 11, the duchy of Wolfsbitter; 12, the principality of Blankenburg; 13, the duchy of Holstein; 14, the duchy of Mecklenburg; 15, the
the principality of Schwerin; 16, the principality of Ratzeburg; 17, the county of Ranzau; 18, the free imperial cities of Luebeck, Goslar, Muhlhausen, Nordhauen, 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 margravate of Moravia; 3, the margravate of Upper Lusatia; 4, that of Lower Lusatia; 5, the duchy of Silesia; 6, the county of Montbellard; 7, the three circles of the immediate Knights of the Empire, in Szuibia, Franconia, and on the Rhine; 8, the lordships of Aich and Wafflerburg, the convent of Schollenthal, the burggraviate of Freudenberg, the barony of Hordgen, the abbey of Cappenberg, that of Elten, the lordship of Rheda, the abbey of Burcheid, the lordship of Jever, the barony of Kniphauzen, the lordships of Dyk, Meckernich, Schuamn, Wylre, Richold, Stein, Dreyfs, Landkron, Rhade, Saffenberg, Schaumburg, Oberstein, 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 southern 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 wine thrives, and yields excellent wine, in all the southern parts. The falsity 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 soil varies more than in Germany. Sandy plains and barren heaths predominate in the north-east, 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 Szuibia by the Rieben Geburgh, or the Giants' 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 Fichtelberg, the Harz, or Hereymian 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 Speilart, the Schwarzwald, 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 Szuibia, which forms one of the boundaries towards Switzerland; the Chiem see, in Bavaria; the Grafler see, in Austria; the lakes of Damascus, Neuwarp, Madsen, and Wilm, in Pomerania; those of Werbelrus, Uckersee, Pareklin, Schwiiduch and Rappin, in Brandenburg; the Dammer see, in the county of Diepholz, 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 six, 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; Wimbachbrunn, in Szuibia; Toplitz, in Austria; Heilbron, in Bavaria; Witten and Salters, in the circle of the Upper Rhine; Freyenwalde, in Brandenburg; Dobbe- ran, in Mecklenburg; Laukhedt, in Saxony; and Pymont, in Westphalia.

As almost all climates, or at least all temperatures and foils, 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; such as excellent quality, hemp, hops, tobacco, madders, saffron, rape-seed, rhabar, excellent garden vegetables and orchard fruits; wine, in greatest perfection on the banks of the Rhine, Mayne, Moselle, 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 Friesland, Oldenburg, Holstein, and some parts of Hanover and Wittenberg, is very indifferent. The number of oxen is not sufficient either for agricultural purposes or for consumption. The best breed is in East Friesland, 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 ailes and mules. The forests are cleared with wild boars, hogs, deer, and hares. Poultry is abundant. Salted and smoked goole, 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 flogging birds, particularly Canary birds and goldencheeks, which are exported to almost every country of Europe. Bees are less 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 Saale. Silver is more plentiful; its annual produce exceeds 200,000 marks, that of copper amounts to 100,000 cwt. The supply of tin from the mines is sufficient for home consumption. Iron of a very good quality, lead, quicksilver, coal, salt, asphalt, and mountainous parts, where they also rear ailes and mules. The forests are cleared with wild boars, hogs, deer, and hares. Poultry is abundant. Salted and smoked goole, 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 flogging birds, particularly Canary birds and goldencheeks, which are exported to almost every country of Europe. Bees are less attended to than in ancient times. Silkworms are reared with particular care in some of the southern, and even northern districts.

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The principal manufactures of Germany are those of linen and woollen cloth, cotton, thread, lace, china, hardware, inferior to none but the English, gials, tobacco and snuff, writing paper, soap, wax, toys and trinkets, and silks, but not equal to the French. Manufactures flourish most in the Austrian and Prussian dominions, in Saxony, in the present kingdom of Westphalia, in the grand duchy of Berg, &c. The towns most remarkable for extensive manufactures are Altona, Augsburg, Berlin, Bronsvick, Bremen, Caffel, Cet. Cc 2 Chemnitz.
Chernitz, Deflau, Dresden, Eisenach, Erfurt, Erlangen,
Francfort on the Mayne, Göttingen, Gottha, Hamburg,
Hanau, Hanover, Harrenforth, Hof, Leipsic,
Lubeck, Magdeburg, Meissen, Neufstadt on the Dicke, Newfeld,
Nurnberg, Offenbach, Plauen, Quedlinburgh, Stuttgart,
Ulm, and Zwickau.

Situated almost in the centre of Europe, bounded by the
Baltic and North sea, and intersected by many large rivers,
Germany has enjoyed, till very lately, a most extensive com-
merce. Its principal ports are Hamburgh, Altona, Kiel,
Lubeck, Wismar, Roflock, Stralsund, Stettin, Emden,
Bremen. Inland towns of great trade are Brunswick, Mag-
deburg, Leipsic, Naumburg, Francfort on the Mayne, and
Francfort on the Oder, Vienna, Augsburg, Nurnberg,
Breslau, and Ulm. The principal articles of exportation are
timber, corn, fruit, wine, tobacco, madders, coal, flax, al-
potash, horses, oxen, salt and smoked meat, butter, cheese,
honey, wax, leather, wool, cotton yarn, linen cloth to the
amount of six millions flerling, linen yarn, thread lace, cotton
fluffs, hardware, lead, copper, brass, quicksilver, china,
carthen-ware, mirrors, glass, wooden toys and trinkets, &c.
Germany imports corn, oxen, and horses chiefly from Hun-
gary, Poland, and Denmark, hops from Hungary, those
from Ireland and Holland, flax and cotton, all sorts of co-
lonial produce, wine and fruit, silk and cotton fluffs,
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
transactions are carried on by means of the bankers of Vienna.
The principal insurance companies are at Hamburgh, Lu-
beck, 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
principalties 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 Passau in 1552, of Augsburg in 1555,
and of Mantsl in 1548, the Roman Catholic, Lutheran, and
reformed religion, were acknowledged as dominant in Ger-
many: 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 re-
port to the third clafs 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 ancients, par-
cularly 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, Leipzick,
and Göttingen, rank among the best in Europe. Before
the revolutionary wars, the number of authors exceeded
7000. 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 1807,
it has never exceeded 1500. Two hundred German, and
about thirty foreign book-sellers, used to meet at Leipzick,
to barter their respective publications; the amount of these
exchanges was generally above 200,000 flerling. 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 2000. Before that period the literary labours of the
Germans were confined to theology, jurisprudence, and bib-
ilical 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, chemic-
istry, 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 delirious affection 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.
The great names of Luther, Kepler, Leibnitz, Haller,
Euler, Moebius, Puffendorf, Pott, Marggraf, Hagedorn,
Lessing, Gleim, Kleist, Heyne, Rahener, Kleopock, Ram-
ler, Gellner, who live in the records of literary fame, must
be added those of Bernoulli, Lambert, Klaflner, Wieland,
Schiller, Gottle, Herder, Zollkoffer, Spalding, Bloch,
Mof, Mendelsohn, Klapproth, von Humboldt, Vols, Holty,
Michaelis, J. A. Eberhard, Von Zach, and many others,
whose merits are as conspicuous as they are generally ac-
knowledged.

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 so great, that the German and English millionaries
that went to Sweden, Denmark, and Norway, had no difficulty
in making themselves understood in those countries. The
learned Hume, in his introduction to his Sueo-Gothic Glos-
sary, has also discovered a startling conformity between the old
Teutonic and Persian 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 Westphalia, in the dukedoms of Mecklen-
brug and Holstein, and in Pomerania: it comes very near the
Dutch. The High German, or High Dutch, has been con-
 siderably improved since Luther's time: it is remarkable
for strength, richness, bold invention, and compound words,
which renders 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 Saxon, part
of Lower Saxon, and on the banks of the Neckar and the
Maine. There are still some traces of the Slavonian lan-
guage left on the shores of the Baltic, in some districts of
Pomerania, in Silesia, Bohemia, and Moravia: but it is dis-
appearing 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.: Greifswalde, Jena, Leiden, Wittenberg, Gottingen, Halle, Helmstedt, Kiel, Rostock, Altdorf, Erlangen, Rinteln, Giesenh, Marburg, Stuttgart, Tubingen, Frankfurt on the Oder, are Protestant universities; Bamberg, Witzzburg, Paderborn, Fulda, Dillingen, Freyburg, Inpruck, Vienna, Ingolstadt, Salzburg, 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 lectures, this opens an honourable and useful competition 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 Bapfelow, profiting by the hints thrown out by J. J. Rousseau, opened the Philanthropinum at Delfau, and set an example of liberal and scientific education, which was soon imitated by men of enlightened views and extensive information. Campe, Villaume, Saltzmann, Trapp, and latterly Pfalzlozzi, have eminently contributed to introduce better modes of instruction. There are also many establishments destined to train young men for particular employments, such as military, mineral, commercial, and even agricultural schools. Females are most 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 Cadiz, Erfurt, Gottingen, Hanover, Manheim, Munchen; the agricultural societies at Halle, Leiden, and Holstein. The best public libraries are those of Berlin, Delfau, Gottingen, Gottha, Hanover, Leiden, Manheim, Stuttgart, Weimar, Vienna, and Wolfenbuttel. 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 titles, with bad types, and on bad paper. A few splendid editions have, however, been attempted at Leiden, and met with merited success. The liberty of the press, which was never general all over Germany, has received its death-blown from the fury which the French government exerceses 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 revered by their rivals. Germany has also produced some good painters and engravers, but few statues 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, Delfau, Leiden, Manheim, and Vienna. The most celebrated galleries of pictures are at Delfau, Vienna, Sans Souci, near Potsdam, Dassel, Manheim, and Caffel.

The influence of the arts on the manners of a people is no where 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 affable.

Before the peace of Luneville in 1801, the population of Germany was rated at 27 millions of inhabitants; but as it lost 3,795,000 individuals, though 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, Livonia, Prussia, and the greater part of Poland, were peopled by the various tribes of one great nation, whose complexion, manners, and language denoted a common origin, and preferred a flinking resemblance. On the west, ancient Germany was divided by the Rhine from the Gallic, and on the south 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 descried a frozen ocean, that lay beyond the Baltic sea, 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 the fact, and the explanation 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
with constitutional bravery, which is the result of nerves and spirits. "In hos artus, (fays Tacitus, Germania, iii. 20.) in his corpore, qua manumur, excemens." The severity of a winter campaign, that chilled the courage of the Roman troops, was fearfully felt by those hardy children of the north, who, in their turn, were unable to resist the summer heats, and disdosed away in languor and ficknifs, under the beams of an Italian sun.

As to the origin of the Germans, although we cannot allow with Tacitus, that they were "Indigena," or natives of the feil, 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 preceding of this article, from the gradual union of some wandering barbarians, probably of the same nation with the Celts and Gauls, and both, perhaps, defended from the ancient Goths, or descendants of Homer, the eldest son of Japhet. (See Dispersion 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 languages, as affords a very strong presumption that they were defcaled from the same ancient stock with the Celts or Gauls, and that they came by gradual and successive migrations from Asia. (See Celtica.)

How this country came to be denominate 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 "ghar man," a warrior like man; but this was not their original name, any more than the appellations of "Tentones" or "Allemanii," by which, as we have already observed, they were occasionally denominate. This name was of a more modern date, and seems to have had its rise on the other side of the Rhine, when the Cernufts, Eburonese, Carabin, and Pannonian 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 Rhinenth here 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 German tribes, 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 Cæsar and Tacitus is so unfavorable, 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 destitute of neither strength nor courage to have forced their way into others more pleasant and fruitful. These ancient historians 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 flaterity of its foil. 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. 19); and the use of letters is the principal circumstance that distinguishes 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 2,350 walled towns, whereas, in a much wider extent of country, the geographer Ptolemy could discover no more than ninety places, which he describes 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 Cæsar; and Tacitus affirms 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 tiles, were employed in these slight habitations. They were, indeed, no more than low huts of a circular figure, built of rough timber, thatchted with straw, and placed at the top to leave a free passage for the smoke. That these confidered 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.

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 forts, with which the forests of Germany were plentifully stocked, supplied its inhabitants with food and exercise. Their numerous 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 artificial 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 wasted both skill and patience to investigate those rich veins of silver, which have so 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 borderers 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 earthen 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 carelessness 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, defirous of every art that might employ his leisure hours, consumed his days and nights in the animal gratifications of sleep and food. Nevertheless, the found that summoned the German to arms was grateful to his ear. It raised 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 infaming their passions, the other by extirpating 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 possession and enjoyment of property are the pledges which bind a civilized people to an improved country. But the Germans, who carried with them what they most valued, their arms, their cattle, and their women, cheerfully submitted to the invariable silence of their woods for the unbounded hopes of plunder and conquest. The innumerable swarms that invaded, or seem'd to infest, from the great flour-bowl of nations, were multiplied by the terrors of the vanquished, and by the credulity of succeeding ages. And from facts thus exaggerated, an opinion was gradually established, and has been supported by writers of disingenuous reputation, that in the age of Cæsar and Tacitus the inhabitants of the north were far more numerous than they are in our days. On this subject sir William Temple and Montesquieu have indulged the usual licence 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 Marmion 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 definies and our possessions are the strongest fetlers of despotism. Cæsar 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 pasturage. They neglected agriculture, as we have already seen; their chief food was milk, cheese, and flesh. While society remains in this simple state, men, by uniting together, scarcely relinquish 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 differed justice and accommodated differences. In the far greater part of Germany, the form of government was democracy, tempered indeed, and controlled, not so much by general and positive laws, as by the occasional ascendant of birth and value, of eloquence and superstition. 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 bufiness of peace and war, were determined by its independent voices. Sometimes these important questions were previously considered, and prepared in a more select council of the principal chiefmen. The magistrates might deliberate and peruse; the people only could resolve and execute. When timid, though just and prudent, counsels were proposed, they expressed their dislike by a hollow murmurm. But whenever a popular orator proposed to vindicate the meanest citizen from either foreign or domestic injury, whenever he called upon his fellow-countrymen to avert 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 pressmg 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 suprême chief. Princes were, however, appointed, in the general assembly, to administer justice, or rather to compose differences (minor controversias, Caesar) 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 first 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 picker refitted with disdain the authority of the magistrates. Every individual among the ancient Germans was left at liberty to chuse 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 attach them to his person and interest. Caesar calls these adherents Ambacti and Cosentes, i.e., retainers or clients. Tacitus calls them Comites, or companions. The chief distinction and power of the leaders consisted in being attended by a numerous band of chosen youth. This was their pride as well as ornament during peace, and their defence in war. The leaders gained, or preferred, the favour of these retainers by presents of armour and of horses, or by the profuse though inelegant hospitality with which they entertained them. But even after they united in society, the Germans circumscribed the criminal jurisdiction of the magistrate within very narrow limits, and exercised almost all the rights of private refection and revenge. Their magistrates had the absolute disposition 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 imprisonment, 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 sate, a part to the person who had been injured, or to his kindred.

Chastity is admired, almost 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 custom rather than by law. Adulteries were punished as rare and insupportable 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 ladies; 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 a better safeguard 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, confided them on every occasion of importance, and fondly believed that in their breasts reposed a sanctity and wisdom more than human. Some of these interpreters of fate, such as Valleda, in the Batavian war, governed, in the name of the Deity, the fierce nations of Germany. The rest 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 dreaded death much less than the foe. 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 supplant every tender emotion that floated in competition with honour, and the first honour of the sex has ever been that of chastity.

The religious fylem 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 supposed to preside over the most important occupations of human life. They were persuaded that by some ridiculous arts of divination, they could discover the will of the superior beings, and that human sacrifices were the most precious 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 superstitious rites, but likewise more cruel and inhuman in them. It appears, from the testimonies of Caesar, Tacitus, Dio Cassius, 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 Love 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, i. e. 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 Hefas or Efus, and under the emblem of an oak, which was consecrated to him. The goddess Hertha was one of their ancient deities, and her idol was preferred in a wood or grove, "Caellum nemus," upon a covered cart, and she had but one priest to minister 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 "Magna Deorum Mater." A solemn procession was occasionally celebrated in the preceding countries of Mecklenburg and Pomerania. The unknown symbol of the "Earth," covered with a thick veil, was placed on a carriage drawn by cows; and in this manner the goddess, 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 reliefs Germans had an opportunity of taining 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 revered in the groves of superstition, were placed in the front of the battle; and the hostile army was devoted with dire execrations 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 gross paradise of immortal drunkenness. (See the Edda, p. 25.) 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 these noble principles of religion and virtue were soon corrupted as instruments 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, whose 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 same name. As to the immortality promised 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 ardor of those songs; and the passions 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 first 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 raised 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 untet...
GERMANY.

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 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 latter kind, besides 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 sacred, that the most solemn and obligatory oaths were those which they took upon a naked blade. Nor did they affix in any solemn rite, without their sword, shield, or spear. They even wore them at their familiar visits, banquets, and religious dances; and they were frequently to be burnt or buried with them, when they died. The sports, games, and exercises of the Germans, were of the masculine kind, and such as seemed to 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 us, and by 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 let to such 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 facility. In some cases their love of liberty, and hatred of tyranny and oppression, precipitated them to acts of treachery and even of murder; for in such cases they were easily incensed, and extremely vindictive. On other occasions, Tacitus says, they were noble, magnanimous, and beneficent, without ambition to aggrandize their dominions, or to invade those from whom they received no injury; rather choosing to employ their strength or valour defensively, than offensively; to preserve 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 funeral rites, 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 dree. They then deposited their ashes in urns, like the Gauls, Romans, and other nations. It may be observed in general, that the sacrifices they offered for their dead, the presents made to them at their funerals, and the other superstitious rites performed on those occasions, were all the while, and the evidence of an established belief, that the soul was immortal.

Their revolt against Augustus, which was suppressed by Agrippa, 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. Aurelius, Alexander, Maximian, Valerian, Aurelian, Probus, Constantius, Julian, Valentinian, and some of his successors. Some hints are taken of these conflicts under the names of the Alamanni, Gepidae, Franks, Suevi, Heruli, and Burgundians. Their country was divided into a number of petty dukedoms, 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 empire was shattered by the Northern barbarians, Germany was again run over by the Franks about the year 480, and continued in subjection to chieftains of that nation, who governed over the Batavians, Alemani, Frisians, Saxons, Thuringians, and Bavarians, until the end of the eighth century, when Charlemagne 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 governed 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 Charlemagne was a structure erected in so short a time, that it could not be of long duration. Under his immediate successor 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 monarchies, so fortified, as to give rise to a perpetual rivalry between them. But the princes of the race of Charlemagne, who were placed on the imperial throne, were not altogether fo degenerate as those of the same family who reigned in France. In the hands of the former, the royal authority retained some vigour; the nobles of Germany, though possessed of extensive privileges and ample territories, did not so early attain independence. The great offices of the crown continued at the disposal of the sovereign, and during a long period, 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 Charlemagne became extinct upon the death of Louis IV. His feeble descendants who reigned in France had sunk into such contempt, that the Germans, without looking towards them, exercised 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 Saxony, who declined it on account of his great age, and recommended Conrad, count of Franconia. The latter was unanimously elected emperor. His reign was disturbed by the disobedience of some nobles whom he subdued, and by the pretensions of Henry, son of the duke of Saxony, his benefactor. Their quarrels, however, did not prevent Conrad from acknowledging the merit of that prince in the same manner as Otho had done his. He recommended Henry as the fittest prince to be his successor, and his proposal being approved by the nation, he sent to Henry, without waiting for the hour of death, the crown, the sceptre, the lances, the sword, and other imperial ornaments.

Henry I. ascended the imperial throne of Germany in 919. He was surmounted the Fosider, because he was passionately fond of hawking. To confirm his authority, he made more use of persuasion than of arms. His descendants, the three Othos, were placed in succession on the imperial throne by the suffrages of their countrymen. The extensive terri-
tories of the Saxon emperors, their eminent abilities, and enterprising genius, not only added 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 will. He annexed the kingdom of Italy to the German empire. Elated with his successes, he assumed the title of Caesar Augustus. 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 incapacity of some of his successors was such, as would have encouraged vassals, left enterprising than the nobles of that age, to have claimed new rights, and to have assumed new powers. The civil wars in which other emperors were engaged, obliged them to pay perpetual court to their subjects, whose support they depended, and not only to connive at their usurpations, but to permit and even to authorize them. Fiefs gradually became hereditary. They were transmitted not only in the direct, but also in the collateral line. The investiture of them was demanded not only by male but by female heirs. Every baron began to exercise sovereign jurisdiction within his own dominions, and the dukes and counts of Germany took wide steps towards reclaiming their territories distinct and independent states. The Saxon emperors observed their progress, and were aware of its tendency. But as they could not hope to humble vassals already grown too potent, unless they had turned their whole force and attention 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 obstinate not to alarm them by any direct attack on their privileges. 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 Francorian and Swabian lines, whom the Germans, by their voluntary election, placed on the imperial throne, a new face of things appeared, and a scene was exhibited in Germany which astonished 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, excommunicated, and deposed their former masters. These pretensions gave rise to the factions of the Guelphs and Ghibellines, of which the former was attached to the popes, and the latter to the emperors. Pope Gregory VII. had observed 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 disposed them to favour any attempt to circumscribe their power. He forewarned 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 privileges and independence. With both of these Gregory negotiated, 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 vileness and corruption with which the emperor had granted the investiture of benefices to ecclesiastics. He contend- ed 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 domain. All the confines 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 sons, were threatened to be distrusted 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 captive in which the pope refused, and to fling there three days barefooted in the depth of winter, imploring a pardon, which he obtained with difficulty.

This act of humiliation degraded the imperial dignity. The two factions kept Germany and Italy in perpetual agitation during three centuries, and, notwithstanding the return of some short intervals of vigour, under the administration of a few able emperors, the imperial authority continued to decline. During the anarchy of a long interregnum, subsequent to the death of William of Holland, it dwindled down almost to nothing.

In the year 1273, Rodolphus of Hapsburgh, 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 excite no jealousy in the German princes, who were willing to preserve the forms of a constitution, the power of which they had destroyed. Several of Rodolph's successors were placed on the imperial throne from the same motive, and almost 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 constitution 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 territories with full sovereignty. They acknowledged no superior with respect to any point relative to the interior administration and police of their domains. They exacted taxes, imposed taxes, coined money, declared war, concluded peace, and exercised 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 Hapsburgh, 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 divisions among its members gave rise to perpetual private wars, which were carried on with all the violence that accompanies refluxment when unrestrained by superior authority. Rapine, outrage, executions, became universal. The variety of expedients employed to restore order and tranquillity, prove that the grievances occasioned by this state of anarchy had become intolerable. Arbiters 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-
in 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 inefficient. At length Maximilian 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 notwithstanding the salutary effects of these regulations, the political constitution of the German empire, at the beginning of the sixteenth century, was of a species peculiar as not to resemble perfectly any form of government known either in the ancient or modern world. It was complex body, formed by the association of several states, electors, princes, dignitaries of the church, counts, barons, and free cities, each of which possessed sovereignty 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 issued; 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 sovereignty 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 Achaeian 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 overlords. 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 former considered the emperor only as the head of a confederacy, the members of which, by their voluntary choice, raised him to that dignity; the latter seemed to imply that he is really invested with sovereignty power. The emperors were distinguished by the most pompous titles, and by 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 a 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 Belf 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 consequence of this ill-constructed frame of government was, that the emperors imagined themselves to be the real overlords of Germany, and aimed at simultaneously recovering the exercise of those powers which the forms of the constitution seemed to vest in them, and which their predecessors Charlemagne and the Osias had actually enjoyed. But, the princes and states, aware of these pretensions, watched the decisions of the imperial court to circumscribe its power within limits still more narrow. This jealousy of the imperial authority increased considerably 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 amid 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 uncertain, and they were dignified with the appellation of Electors. (See Elector.) The nobility and free cities, being thus deprived 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 unequally, were held by the ecclesiastics raised to those dignities. 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 that 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 dissension must be added another, 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, endeavored 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 overawed or corrupted, tamely surrendered their privileges, or meanly favored the defigns formed against them.

But the empire of Germany comprehended countries of such vast extent, and was inhabited by such a martial and hardy race of men, that when the abilities of an emperor, or zeal for any common cause could rouse 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 favor 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 life-time. 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 favor 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 perfected the numerous sects in Bohemia. They took up arms; the brave Mansfeld fought at their head, and Matthias, who came to the assistance of his kinman, 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, who 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 spouse 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 interruption from the battle of Prague to the peace of Westphalia. 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 Gustavus Adolphus of Sweden rushed upon him. In vain did the Imperialists commanded by Tilly endeavour to check his career; they were defeated and dispersed. Ferdinand was going to sue for peace when the fall of the Swedish monarch at Lutzen re-animated his hopes; Wallensteins's defection did not arrest his arm. He continued fighting against his Protestant vassals to 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 Gustavus Adolphus. History will never forget the names of the duke of Saxe Weimar, of Bannier, Torlenton, Piccolominini, Mercy, Wrangel, and many others who shook the Austrian power, till at length a general peace was concluded at Westphalia in 1648, which brought tranquility to Sweden and Germany. 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 Westphalia.

Leopold I. who was elected emperor of Germany, after the death of his father Ferdinand III. in the year 1652, 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 valor of John Sobieski, king of Poland. The fertile province of Alace 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 in 1699. During Leopold's long reign, the duke of Hanover was admitted into the electoral college, the elector of Saxony obtained the elefive 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 IV. of Anjou, grandson to Louis XIV. The elevation of Charles to the empire terminated the contelations 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 Passarowitz with the Turks in 1717.

Charles VI. intent upon securing his hereditary dominions to the 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 after five years of disastrous warfare, he died deprived nearly of all his states. Maria Theresa had sufficient 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 27th 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, Ruffia and France, and being subsidized by England, occupied Saxony, and refitted the attacks of his numerous enemies with alternate succeses, for the space of seven years. Peace was at length signed once more at Hubertusburgh on the 15th of February 1763. 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 profess himself of part of the dominions of Charles Theodore, the last elector of Bavaria, who died in December 1777, disturbed the peace of Germany for a short time. No battle of any consequence was fought between the Austrian and 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 Wiltphalia 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 pillar of the Germanic constitution, died in 1786. Ambitious of imitating the example of his illustrious opponent, Joseph II. introduced many futile reforms in the administration of his dominions, proclaimed an unbounded religious toleration, suppressed a number of useless empires, abolished the use of the rack in criminal inquisitions, and extinguished the remains of servitude and villainage which oppressed the peasants of his dominions. But his well-intended innovations were too sudden. Difcontent broke out in the Netherlands, which he vainly attempted to still by force instead of adopting conciliatory measures. The rebellion of his Flemish subjects broke his heart. He died childlesse, 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 affright the emigrants in their attempts to re-enter France by force, hallowed 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 Brittan, and all his posessions 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 Wiltphalia, which had been regarded as the basis of the political system of Europe, had, in fact, fown the seeds of the dissolution of the German empire, by conferring on each prince and state of the German confederacy the privilege of contracting alliances in their own names. 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 surprize 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 Whiff farmers in the former envied their livelihood by study, the clergymen in the latter were even ignorant of the first four rules of arithmetic. Palitzsch, a Saxox 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 persuasions and places, is the industry and perseverance of the middle and lower ranks, and the pride and haughtinefs of the nobility. As soldiers, the Germans, when ably commanded, have always shewn themselves endowed with steady courage and persevering 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, Württemburg, and the inhabitant of Wurttemberg, Baden, Berg, Hesse Darmstadt, Naflus, and the other smaller states of the confederacy of the Rhine. I. G. Meusel's Statistics. Robertson's Introduction to the History of the emperor Charles W. Bufting's Geography. Anc. and Mod. Univ. Hist. Gibbon's Decline, &c. of the Roman Empire.

GERMANY, Upper and Lower, in Ancient Geography, divisions of Gaul; which see.

Germans, in Geography, a town of America, in Adams' county, Pennsylvania, containing 1012 inhabitants.

GERMEN, or GER, see Embryo.

Germes, in Botany and Vegetable Physiology, the rudiments of the fruit, constituting one of the two essential parts of the pistil of a flower, the stigma being the other; the style, which usually elevates the latter, not being indispensable, nor always present. The Latin word germen properly means a bud, or sprout (see Gemma); which latter, in scientific language, is now universally used in its stead. Linnæus therefore applied germen technically, and very happily, to the 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 officially have contended with him in such a point, the celebrated Jullien. Nevertheless, Gertner, assuring some well-founded authority on account of his valuable labours respecting fruits and seeds, prefers the word ovarium, borrowed from anatomists, for it is not classical Latin. The only reason for this innovation is, as he is pleased to express it, that Linnæus "recte impropreo" calls this part germen. The authority of Gertner has unfortunately milled one excellent writer of late to adopt the term ovarium, to 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 Gertner in the original anatomical sense, but in a new and arbitrary one. Vegetables have no such organ as the ovarium of animals. Malpighi, much more correctly, calls the germen the "uterus"; by this is meant the same organ used by plants with naked seeds; whereas germen is applicable in all cases to the rudiment of the fruit, whenever 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 are 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 

"Persionation of Plants." In an advanced state the family as a whole cannot but be the presence of fused inflorescences in a certain sense, that is, such as have only their own carinal elements, but no real perianthus or seed-covert.

Gartner very successfully combats the Linnaean hypothesis, that the germ originates from the path of the plant, as the flammers from the woody part. This idea was purely hypothetical, and is unsupported by any anatomical fact, however ingenious the theory of germination deduced from it by the illustrious Swedes.

The germ is formed 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 germ, 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 germ, 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 hafts or withered rudiments of seeds are found in an advanced impregnated germ; and still more generally the whole germ withers if the flammers and stigma have not performed their office.

Germens are either solitary or numerous, simple or aggregate, in different genera of plants. With respect to situation, it is important to note whether the germ 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 monotypic genus Sarracena, some species have a superior and others an inferior germen. This proves, on a careful anatomical 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 show that there is perhaps no such thing as an inferior germen, strictly speaking, because there must necessarily be a continuation of the integuments of the flower and their velvets, in some form or other, along the outer part of what is commonly deemed an inferior germen, to the stamens whatever their nourishment is derived. But this "were to consider too curiously." The line is in almost every case drawn with sufficient distinction for all useful purposes, and is generally indicated in due time by a spontaneous separation of parts. Sarracena is erroneously judged by Linnaeus to have the germ below the corolla though above the calyx, a strange and unexampled circumstance indeed! He was misled by the close adherence of the thin pellucid tube of the corolla to the germ. In Abies, however, there is an approach towards such a singularity of structure, the calyx being inferred half way down, while the corolla crowns the germ, for this plant, being akin to Sarracena, particles of that irregularity of position in the germ which we have already described naked eye.

Nothing is more wonderful than that difference of vascular constitution in the germens of different genera or natural orders, by which, though in all cases nearly equally juicy while young and growing, in some it becomes coriaceous, or woody, and dry, as it ripens, while in others it attains a soft pulpy consistence, which obliterate its all its original internal structure. The wife ends nourished by these differences are indeed apparent, but the means by which they are accomplished are, if not ineradicable, at least unexplained.

GERMEN, Str., 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 SEMEUR, and chief place of a canton, in the district of Sancey, 5 miles S. of Sancey. The place contains 1,251, and the canton 11,383 inhabitants; in 16 communities. It is situated at the confluence of the Oise and the Rhine, and was erected into a town by Rudolph, I., who died here in 1290. It was taken by the French in 1794. N. lat. 49 12. E. long. 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 simulating its vital principle. These agents must perform their functions together, in order to produce a salutary effect, otherwise the vital principle, or the chemical properties of the seed, may be imitated or spoilt, 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-velvet, in order to succeed with certainty. A seed absorbs, through the vessels of its base, or feet, 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 adsorbed by seeds, in the moments of incipient germination, from air or through the surrounding foil. 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 stimulus of moisture, for that reason (as Dr. Darwin ingeniously judged,) elongates itself in the direction where it meets with this stimulus, 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 seems to us the best 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, confiding of the cotyledons and plumula or bud, being most imitated 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 Cotyledons.

During the process of incipient germination, the immediately necessary function of nourishment, till the young root can derive any from the soil, are furnished by the albumen, a substance either constituting a separate body of itself, as in grapes, corn, palms, etc., which, from a hard, dry, and tailed effect, changes, by the action of water and oxygen, into a milky or fuscaceous fluid, wets the opera-
GERNSHEIM, or GERNSHHEIM, a town of Germany given, in 802, to the landgrave of Hesse Darmstadt; 81 miles E.S.E. of Mann.

GERNYOSZEG, a town of Transylvania, on the river Maras; 10 miles S.W. of Kerestur.

GEROSCOMIA, of 765; aged, and 5000, I chrisi; a term used by the ancients for that sort of medical practice which treated of the proper regimen to be observed in old age.

GEROD, in Geography, a town of Germany, in the territory of Liebfeld, 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; 20 miles N.E. of Wurzburg.

GEROLDSTEIN, a town of Germany, in the county of Katzenelnbogen; seven miles S. of Naufeld.

GEROLSTEIN, a town of France, in the department of the Sarre, and chief place of a canton, in the district of Prum; 24 miles N. of Troyes. The town contains 350, and the canton 2892 inhabitants, in 29 communes. N. lat. 50° 16'. E. long. 6° 38'.

GERON POINT, a cape of Ireland, in the county of Antrim, on the east coast. W. long. 5° 52'. N. lat. 52° 3'.

GERONA, or GIRONDE, Lat. Gerundia, a town of Spain, in the province of Catalonia, the see of a bishop, suffragan of Tarragona. This is a fortified town, of nearly a triangular form, situated on the side and at the foot of a steep mountain; the river Tar 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 12,600 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 1668, &c. The trade of this town is inconsiderable, and its only manufactures consist of a few looms for stockings, coarse cloths, and woollen and cotton stuffs. The cathedral and collegiate churches are the two most remarkable edifices in Gerona. The treasury of the cathedral is richly furnished with chalices, crosses, 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-baths, encircling a reservoir to contain water. The university of Gerona, 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 800 students, who are taught the Latin grammar, rhetoric, philosophy, and theology. The library is select and extensive. Schools are kept by the community of the Beguines for the gratuitous instruction of poor girls; 47 miles N.E. of aecston. N. lat. 42° 10'. E. long. 2° 35'.

GERONIMO, St., a town of Mexico, in New Biscay; 90 miles N. of Parral.

GERONTE, a small island in the Mediterranean, near the coast of Naphza. N. lat. 36° 25'. E. long. 30° 4'.

GERONTE, in Antiquity, a kind of judges, or magistrates, in ancient Sparta; answering to what the Areopagites were at Athens. See Areopagites.

The word is formed of Greek, gerontes, which signifies old men. Whence also the words germen,something belonging to an old man; and geranium, a famous book among the modern Greeks, containing the lives of the ancient men.
The Senate of gerontes were called germen, that is, assembly or council of old men. The gerontes were originally instituted by Lycurgus: their number, according to Ione, was twenty-eight; and, according to others, thirty-two. They governed in conjunction with the kins, 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 ipso et cum ipsi omnia administravit." None were to be admitted into this office under sixty years of age, and they held it for life. They were succeeded by the Ephebi.

GERONTASSA, in Geography, a small island in the gulf of Engia; four miles south of Engia.

GERONTAXON, 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 ρηχος, an old person, and ωτος, a dart.


Gen. Ch. Germon calyx simple, of numerous upright, lanceolate, somewhat awl-shaped, keeled leaves, longer than the corolla. Cor. compound, somewhat imbricated, uniform; each floret hermaphrodite, 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 live, very short; anthers united into a cylindrical tube. Fil. Germin oblong, five-angled, the length of the filaments; ligmas two, thread-shaped, recurved. Petio 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 feathery. 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.

Obi. Linn. has originally described the receptacle as naked, which is confirmed by Gertner, Willdenow, and Jacquin. Afterwards he attributed chaffy scales to this part, which is adopted by Schrober, but, as we believe, without foundation. Jacquin, in consideration of the etymology, properly makes this genus, as well as Tragopogon and Andropogon, of the masculine gender.

Two certain species of Geropagon only are known. They have the cloflest natural affinity to Tragopogon, but differ in the bristles, 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 among indistinguishable species of one genus in others of this natural order.

1. G. albus. Linn. Sp. Pl. 1109. Jacq. Hort. Vind v. 1. t. 33. — "Leaves smooth." — Native of Italy and 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, grapy, smooth leaves, each branch terminated by a small, inconspicuous, pale pink flower, like the pink hawkweed, but far less hardy. The seeds are larger and more remarkable. The herb abounds with milky bitterish juice. Nothing can be more closely allied than this plant to Tragopogon porrifolius of Linnaeus: see Engl. Bot. t. 408.

2. G. hirsutus. Linn. Sp. Pl. 1109. (Tragopogon graminifolius, floridante flore; Colon. Echpr. t. 231.) — "Leaves hairy." — Found by Colonius, who alone of all botanists seems actually to have seen this species in a wood of wild pear-trees near Cirinola in Italy, flowering in May. It appears to differ from the preceding, chiefly in the roughness of its leaves, which neverthelss is so precisely and forcibly indicated by Colonius, that we dare not presume it not to be a sufficient distinction. All authors have adopted this plant from Colonius, nor had Linnaeus a specimen.

A third species occurs in recent writers, G. calciatus; Linn. Syll. Veg. ed. 13. 395. (Tragopogon calciatus; Jacq. Hort. Vind. v. 1. t. 165.) This was received by Jacquin from Italy, and he sent a specimen to Linumaes, who referred it to Geropagon. The habit is that of a Scorzonera. Root perennial. Flower, tall, calyx, and upper leaves hairy. Calyx of a double row of scales, shorter than the corolla, which is yellow. Crown of the seed slightly hairy, and, as far as we can perceive, uniform. — This is certainly no genuine Geropagon, and we are convinced it is the identical Scorzonera hirsuta of Linnaeus, well figured in Colonius’s Ephedras, 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 Geropagon hirsutus of Allioni, Fl Pedem. v. 1. 229, as his fynonym was read, though he took it to be annual. S. GERRARD, in Geography, a county of Kentucky, in America, containing 6083 inhabitants, of whom 1254 are slaves.

GERRARDS, Peter van Zyl, in Biography, a painter, born at Amsterdam in 1607. He came to England and lived in the same house with Vandyke on terms of friendship and intimacy. He studied his manner successfully, and on his return to Amsterdam was so highly thought of, as to bear the name of the second Vandyke.

GERENS, GERUL or GIRONI, in Ichthyology, names given by the Venetians to a fish common in that part of the world. It is the smaris, or marna alba of authors. Artedi very judiciously makes it a species of the sparus, and distinguishes it from others, by its having a black spot on each Ede, and the nectar and tail-tins red.

GERRHA, Eijes, among the Greeks, wicker hurdles, resembling the Roman vinca, which the Romans held over their heads to shelter themselves.

GERRHE, or GERHON, in Ancient Geography, a people of Sceuthia, in Europe, S. of the Danube.—Allo, a people of Asiatic Sarmatia, not far from the Caucasian sea.

GERRHUS, a river of Sarmatia, which runs into the Palus Misodictis.—Allo, a river of Asia, in Albania.

GERRI, 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 Semaur, N. lat. 16 15. E. long. 33°.

GERISH, a small island, near Cape Neddock, 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 1786, and containing 14,000 acres of land, in which are 802 inhabitants; 30 miles N.W. of Worchester.

GERS, a river of France, which rises near La Barthe de Nelles, in the department of the Upper Pyrenees, traveries the department of the Gers, and runs into the Garonne, about three miles S.E. of Agen.

Gers, one of the nine departments of the south-west, or Garonne, region 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 Pyrenees, and on the W. by the department of Landes. This department is composed of Condominois, Armagnac, and Conmingues, and takes its name from the river which crosses it from south to north. Its capital is Auch. It is situated in N. lat. 43° 40'; its territorial extent is 7,474,764 square leagues, or about 539 square miles, and the number of its inhabitants is estimated at 291,845. As it is divided into five districts, viz. Condour, containing 67,103 inhabitants, La Noville, with 57,445, Auch, having 58,285, Lombras, with 37,593, and Miranda, with 79,579 inhabitants. The number of its cantons is 50, and of its communes 700. The total of its contributions, personal, stump-tary, and on movables and immovables, &c., is 5,563,310 francs, and the expense of administration, justice, and public instruction, is 278,498 francs. The soil of this hilly department is indifferently fertile, yielding moderate crops of grain, wine, fruits, and good pastures.

GERSA, or GAIRSA, an island of Scotland, five miles E. of Enhallo, two S. of Weir, and one E. of Mainland, is two miles long and one broad, and contains 50 inhabitants. The greatest part consists 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 GERSAT, a village or town of Switzerland, at the foot of the Rigi, and the smallest republic in Europe. Its territory is about a league in breadth, and two leagues in length; situated partly on a small neck of land at the edge of the lake of Switzerland, and partly lying upon the rapid declivity of the Rigi. It contains about 1,500 inhabitants, having their general assembly of burgesses, their landmanns, 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, excepting a narrow path down the steep sides of the mountain, which is almost impassable. Gersia is entirely composed of scattered hovels 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 silk for the manufactures of Basle. This little republic is under the protection of the four cantons, Lucerne, Uri, Switzerland, and Unterwalden; and in case of war furnishes its quota of men.

The town is six miles distant S.W. from Switzerland. N. lat. 46° 55', E. long. 8° 20'.

GERICHTZ, a town of Bohemia, in the circle of Konigingratz; nine miles N.W. of Konigingratz.

GERGISCHNITZ, 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 groundwork of all difcant was the plain chant; and in his treatise on the education of children for the choir of Notre Dame, he enjoins a particular attention to chanting, counterpoint, and discent, as the three most essential branches of their instruction and study. (Magister cantus flatatis horis docet pueros planum canum principaliter, et contrapunctum, et aliquos discentes honos.—decent and sober melodies.) He likewise tells us, that in this cathedral, during his time, the choirsisters were only allowed, by the statutes, to practise discent till their voices broke. (Nec faciet eos tantum incolere in talibus, quod per dam in grammatica profectum; attento maximse quod in ecclesia sofra discentus non est in ufu, fed per flatataa prorn supporter, solum quod voces quae mutare dicuntur.) The Abbé Lebeuf understands these last words as we have translated them: (Le débâc qui est point au long dans l'Eglise de Vals. XVI.)

Paris, et qu'an contraire il étoit défendu par les flétats, au moins à l'égard des voix qui avoient pafté le temps de la mutation. Traité Hift. sur le Chant. Eccles. p. 92.) The indefatigable Abbé Lebeuf found in the king of France's library the statutes here alluded to, which had been framed in the 13th century, and from which the chancellor had been ordered to make extracts in 1428. He concludes the fourth article of his tracts, which relates to psalmody, by informing us that no written discent was allowed in church missals or graduals, except for the exercise and improvement of the singing boys. (Nec debet in cantu notulato regulariter impleari discentus, propter exercitationem fum.) Gerson, to. iv. ult. edit. p. 717.

GERSFACH, in Geography, a town of Germany, in the county of Eberbach, on the Murg; taken by the French in 1794; three miles S.E. of Baden. N. lat. 48° 48'. E. long. 8° 20'.

GERSFINTZ, a town of Germany, in the county of Erbach; seven miles N.W. of Erbach.

GERSTE, CHRISTIAN LUDWIG, in Biography, was born at Giesen 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 Giesen in 1744; he went first to Altona, and from thence to Peterburgh; but meeting with no encouragement, he returned and attempted to get reinstated in his office, but failing in his design, he inflicted 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, in order to become very expert in the science of meteorology. In the year 1766 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 1768. 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 astronomical 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. Moretti.

GERSTEN, in Geography, a town of Germany, in the principality of Eilenach, on the Werra; eight miles W. of Eilenach.

GERSTWALD, a town of Germany, in the Ucker Mark of Brandenburg; nine miles S. of Prenzlau.

GERTHAUSEN, a town of Germany, in the county of Hennberg; ten miles N.W. of Meiningen.

GERTRUDENBERG, a town of Germany, in the bishopric of Osnabrig; one mile E. of Osnabrig.

GERTRUDENBERG, St., a town of Brabant, but in later times subject to Holland, with a good harbour, formed by the Merwe, which here extends to a considerable lake, called "Bies Bosch," over which is a passage of two hours to Dort. It is built in the form of a crecent, with regular fortifications, good buildings, and forts with sluices, by means of which they can lay the adjacent country under water. In ancient charters it is called "Mons Latinos," the mountain of the shore. In 1645, Pepin de Landen, duke of Brabant, gave it to his daughter Gertrude, who
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 "Mout de St. Gertrude," or Gertrudenberg. The castle was built in 1231. After passing through many vicissitudes, it was ceded 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 Durt, 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 Mannfrist.

GERVAIS, ARMAND FRANCIS, in Biography, was born at Paris about the year 1660; he was educated at 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 pulpit 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 mediated, created an alarm; and in 1698 he resigned his offices, and quitted his residence in the monastery. From this period he wandered, from solitude to solitude, following the same ascetic course of life which he had followed in the habit of practising in the college. Having, in 1744, published the first volume of an interesting "General History of the Cistercian Order in France," in which was a severe attack upon the Bernardins, he was arrested and imprisoned in the Abbey of Notre Dame de 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 Abard and of his wife Helen;" "The History of St. Peter, Abbot of St. Denis;" in three volumes, 12mo. "The Life of St. Irenaeus," in two vols. 12mo. Also lives of St. Paul, Epiphanias, Rufinus, and other eminent persons. He was distinguished as a controversialist, and was the opponent of Father Courayer on the subject of English ordinations. He is characterized as a man of great learning and inglorious virtues, but his manners were austere, impetuous, and forbidding. Moret.

GERVAIS, Sr. in Geography, a town of France, in the department of the Puy de Dome, and chief place of a canton, in the district of Riom; 15 miles N.W. of Riom. The place contains 2182, and the canton 9262 inhabitants, on a territory of 2825 kilometres, in 11 communes.

GERVAIS-de-Maffey, St. a town of France, in the department of the Orne, and chief place of a canton, in the district of Domfront; 9 miles N. N.E. of Domfront. The place contains 1628, and the canton 17,228 inhabitants, on a territory of 1321 kilometres, in 14 communes.

GERVAIS-la-Ville, St. 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 1772 kilometres, in 10 communes.

GERVAIS of Tilbury, in Biography, an historian of the thirteenth century, a native of Tilbury, in Essex, and nephew to King Henry II. He was, through the interced of Otho IV. made marshall of the kingdom of Arles. He wrote a commentary on Geoffrey of Monmouth's British History, and also a trilingual History of England. His other works are "A History of the Holy Land;" "Origines Bur- gundionum;" "Mirabilia Orbis," and a Chronicle; entitled "Imperialium Otiorum." The compilation of the ex-


GERVASIO GATH, the nephew of Bernard; was also a painter of considerable merit in the same style of colouring, as is evident in a picture of St. Schallian, 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 St. Pietro, in the same city.

GERVASO, Sr. in Geography, a town of Italy, in the department of the Mela; 15 miles S. of Brescia.

GERUMA, in Botany, barbarously corrupted by Fork hall from an Arabic name Djerum. Fork. /Egyptiaco-

Arab. 62. Jull. 264. Lamark. Dict. v. 2. 702.—


Gen. Ch. Cal. Persiant inferior, of one leaf, flat, five-toothed, small, green, permanent. Cor. Petals five, lanceolate, abrupt, spreading, three as long as the calyx, white. Nectary, a thick ring surrounding the germen, bearing the filaments on its outer edge. Stam. Filaments five, erect, half the length of the corolla; anthers erect, triangular. Fil. Germen globulo, deeply immersed in the nectary; style thread-shaped, small; stigmas three, widely, spreading, red, wedge-shaped, emarginate at the extremity. Peric. Capsule superior, oval, of four, or perhaps five, cells, and as many valves. Stalk, two, in each cell, oval, inserted 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, allied to a pulp receptacle.

G. alba. Leaves alternate, oval-oblong, somewhat serrated.

This is all that can be gathered from Forkhall's account, and it forms a botanical enigma. Some circumstances indicate an affinity to Jussieu's Euphorbe. The accounts of the stigmas and of the fruit are the most remarkable. Nothing is said of the habit, duration, or sensible qualities.

GERUND, in Grammar, a sort of tense, or time, of the infinitive mood: very like to the participle, but indeclinable.

The word is formed of the Latin gerundius; 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.

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 gerunds: it is certain they are no verbs, because they do not mark any judgment or 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, will have them to be adjectives passive, whose subjunctive is the infinitive of the verb: on this footing they denominate them verbal nouns, or names formed of verbs, and retaining the ordinary regimen thereof.

Thus, say they, tempus est legii librorum, or librorum, is as much as to say, tempus est iuris legii librorum, vel librorum. But others dispute this decision.

The Greeks have neither gerunds nor supines; but instead
of them they make use of the infinitive, in the same manner as the French; 

They insert it thus, "to boire." When the article happens to be made ufe of, then its genitive is put for the gerund in de, as viro, faciendi, of doing; the dative or ablative is put for the gerund in do, and the neuter for the gerund in dum. But the infinitive in this fene is often expressed without the article, as "Apergo aliqui, faculando petitus, an excellent archer; 

Γάμος, fecondum didit, he gave it to carry. In Greek, however, the termination εν corresponds to the Latin gerunds; thus, from λέγειν, to say, is deduced λέγειν, διετούπτω, it must be faid. These verbal adjectives, as they may be called, sometimes denominated gerunds, are ufed occasionally either in an active or a passive fene; τον άνθρώπον, it is for thee to cultivate the ground; τον ανθρώπον, and the body should be accustomed to obey the understanding, and be disciplined with toils and sweat. Xenophen.

An ingenious grammerian oberves, that the Latin gerunds in de, do, and dum, are but the participle in dui in the oblique fenes; and as this is taken from the prefent participle, they have its feme, namely, an active fene. On the fame principle that participles exprefs powers or habits in action, and their tendency is to dignify those powers, and not their operation, i.e. to become abfolute nouns; the oblique fenes of the participle in dui, when alone, become in their naure abfolute nouns. Hence gerunds, being thus nouns in reality, are governed like other nouns in the genitive, dative, accufative, and ablative, either with or without a prepoftion; as ratio folidi, the art of writing; charta utilis, folido, paper is ufeful for writing; promptus ad audietium, ready for hearing, or to hear; memoria excellendo auguriae, the memory is increased by cultivating. Gerunds also, having the nature of nouns, may govern a genitive; as facultas aquarum; ficut lactum connamandum, the power of the beflowing of his lands on his fefcendants. The gerunds, however, as retaining in a degree their verbal character, govern the feme of their repective verbs, as uifendi domum potius, veni ad recipiendum pecuniam, parceando victis. As adjectives affume the nature of nouns when ufed alone in the neuter termination, fo the gerunds in dum, the neuter of participles in dui, become fubftantives, denominating, with is, necefulty or obligation, as vivedum is mihi recte, living well must be to me, or I must live well. Jones's Grammar of the Latin Tongue, 1800.

GERY, Sr. 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 1250, and the canton 6335 inhabitants, on a territory of 180 kilometres, in 9 communes.

GERYON, a name given by some of the affected chemical writers to quickilver.

GERSAT, 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 Iraik; 8 miles S. E. of Mendall.

GESAS, a town of Sileia, in the principality of Neiff; 3 miles S. E. of Patchcan.

GESEKE, a town of Germany, in the kingdom of Weftphalia; 9 miles E. S. E. of Lipbladt.

GESERICH, a lake of Pruifia, in Oberland, near Dutch Erlan.

GESERVAGHERD, a town of Peruca, in Chorofan; 30 miles S. of Esfeman.

GESHEN, Rocks and rivers of. See AMARUA.

GESHURITES, in Scripture Geography, a people who dwelt beyond Jordan, in the half tribe of Manufiah.

GESIS, in Geography, a town of Germany, in the county of Feldkirch; 4 miles E. of Feldkirch.

GESKENDORF, a town of Pruifia, in Oberland; 7 miles S. S. E. of Safald.

GEMSOLD, a town of Germany, in the bishooip of Ofnabruk; 12 miles S. E. of Vorden.

GESNER, Conrad, in Biography, "the greatest naturalift the world had ever seen since Aristotle," the first who ever collected a museum of natural history, and the discoverer of the true principles of botanical arrangement in the flower and fruit, "to which the very existence of botany as a science is owing," was born at Zurich in 1516. Like most of those who have rendered the most eminent services to science or their fellow-creatures, he had to contend with the greatest difficulties, especially with poverty in his youth, and with a feeble and sickly constitution to the day of his death. He very early imbued an ardent love of plants from his mother's brother, named Friccius, and this seems to have led him to the study of animals, and even of fossils. He was educated for the medical profession, which he subfsequently practifed in his native town, and to the emoluments of which he was indebted for the means of pursuing and promoting, by various expenfes means, his darling studies. He founded and supported a botanical garden; kept a painter and an engraver in wood ceftantly in his service, and acquired a very extensive library. He exercised the general habit of reading, with great success, to which the excellence of the botanical cuts he has left us, with respect to the habit as well as ftructure of plants, is owing. Many of these appear in the Epitome of Cкаменiус, and a large collection of the whole has been published in more recent times by Trew and Bömècle, printed from the original blocks. Gefer undertook various laborious journeys in pursuit of plants, especially on the Alps; and while he was, perhaps, the most learned naturalift of his own or any age, he rivalled the best experiences of his contemporaries in practical observation. He united to the investigation of the external characters of plants, the most affiduous attention to their medical properties, and his own health and life were frequently endangered by the experiments he made for the good of others. He was reported to have killed himself with a dose of two drams of the root of Dorsium, but though his stomach was at first debilitated, he speedily recovered, and amused his friends with a narrative of his cafe. At length this great man fell a victim to the more immediate duties of his profefion, having caught the plague, of which he died on the 13th of December, 1565, aged 49. When he found his end approaching, he requested to be carried into his museum, where he expired amid the monuments of his labours, thankful for what he had been able to accomplish, and supported by all the pious hopes and confolations of a Christian philosopher. His piety and benevolence were no lefs eminent than his talents. He was the general peacemaker among fuch of his literary acquaintances as were more inefible or lefs candid, and he laid aside, for a while, his own immediate employements, to devote his services to the family of a deceased friend, Moihan, whose work on Dioscorides he superintended, and published for their emolument. He was much attached, by fimilarity of talent to Valere Cordus, who died in 1541, at the age of 30, on his travels, at the early age of 29, and whose "Historia Plantarum" was fubsequently edited by Gefer. These able botanists had never had a personal interview, and Gefer was much more intimately acquainted with a young man named David Kyber, who died, at nearly the same age, of the plague at Stralsburgh in 1555; and whose "Lexicon Rei Herbariae Trilingue" (Latin, Greek, and German) he pub...
Gesner

Lived 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, of 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. Anatomica."

"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 review 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 diverted from his object by any other cares. This work is arranged according to the plan of Aristotle, only the viviparous quadrupeds are separated from the viviparous. It does not extend to insects or shells. The former however had not escaped the attention of Gesner, for his labours respecting them make a part of the work of Moutet, entitled "Insectorum sex Minorum 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, confining the wooden cuts and names only.

"Aquarium Animantium Enumeratio juxta Plinii," a little 8vo. printed at Zurich in 1556. A list of the German and English names is subjoined.

A little work in Latin, "De Lacute," treating of milk and its preparations, from various authors. Zurich, 1541, in 8vo.

"De Secretis Remedia Theofuris," a Pharmacopoeia, which has gone through a number of editions in various languages.

"De rari et admirandis herbis, quae fiv quod notce luceant, fie alias ob causs, Lamarce nominatur." A curious and learned little work, with wooden cuts, in 4to. Zurich, 1555. It is accompanied with a description of the celebrated mount Pilay, or Mons Prado, the northern extremity of the Alps, which Gesner visited in 1555. Several alpine plants are here, for the first time, noticed.

"De omnium Fossilium gener." Zurich, 1565, 8vo. Also "De rera Fossilium, Ladipum et Geranarium maxime figuris," with wooden cuts, more curious than useful.

The botanical remarks relative to the scientific arrangement of plants, on which the supereminence 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 Simler, 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 glassies. S.

We have received the following additional account of C. Gesner, in relation to his medical profession.

His father, who was a worker in hides, was killed in the Swiss civil war, and left him in such poverty, that he went to Stralsburg, 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 service; in study; and he made such progress while at Stralsburg, 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 expedition was successful, and even procured him the means of visiting Montpellier, where he refined the study of medicine, which he completed, by taking the degree of doctor at Basle 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 closet, 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 Bublin in 1561. He even cut 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 pulled into Italy. In order to study the nature of fishes, he went to Venice with a view to investigate those of the Adriatic, and sometime afterwards he repaired to Stralsburg to examine those of the Rhine. From these sources of information, from a constant personal observation, conjoined with the study of the writings of the ancients, he obtained the means of accomplishing that immensity of treasures, which a man, who only attained to 49 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 gymnasia of Anspach, and...
and was quickly distinguished by his progress in the ancient and oriental languages. From Ansbach he went to Jens, where he exhibited his learning and talents in several publications. In 1715 he was appointed co-rector of the gymnasium of Weimar, and keeper of the public library. In 1730 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 class, and was afterwards appointed a councillor 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 Latinatatis," and his "Thesaurus Latinus Lingue et Eruditionis Romanae," 4 vols. fol. Geffreys's elaborate work, followed the order of Stephanus, but added such notes and other improvements as appeared necessary. These additions confute chiefly in the number of remarkable phrases and passages from the Roman classics with illustrations. Gen. Biog.

GESNER, Solomon, was born at Basel, in Switzerland, in the year 1559. Having received the early part of his education at his native place, he was sent to Breflaw 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 mathematics, and the learned languages, as well the Hebrew, Chaldee, and Syriac, 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, afeessor in the ecclesiastical consistory, and first preacher in the church. His close application to businefs injured his health, and he fell a sacrifice to a complication of disorders in 1605, when only in the 46th year of his age. His works are a Latin translation of "The Prophecy of Hosea," "Disquisitions on the Pfalms," 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.

GESNEB, 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 Bafle, and with whom he maintained a close correspondence during the life of that distinguished man. Their tale 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 clafs, and other difficult branches of the science, as well as to the anatomy and physiology of plants. He survived his learned friend 12 years, dying in 1793, at the age of 81.

This author published two physiological dissertations on plants in 1749 and 1751, reprinted at Leyden in 1753, along with Linnaeus's "Oratio de pergaminatis intra patriam." In these he treats of the life and structure of vegetables, their propagation, fettes, chaitic motion of some of their fflans, and their methodical classification. He reviews the experiments and observations of Leeuwenhoek, Malpighi, Grew, Hales, &c. announces the new system of Linnaeus, whom, with a kind of prophetic spirit, he calls a man destined to reform all natural history. These disftinctions are the most magnificent 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 grosseft deceptions. A perfon prefented him with a common meadow Crowfoot, on some branches of which were flack flowers of the common Daily. He immediately published, in 1753, a learned dissertation on vegetable monstres, entitled "De Ranauculo bellidiforo," in which he exhibits a figure of this flrange anomoly. As Haller had given his function to the discovery, botanifs could scarcely fuppose it was an evident mistake, till Dr Joseph Banks obtained the original fpecimen after Geffer's death. On its being fent to with boiling water, in the presence of several botanifs, amongst whom was the writer of this, the flam of the Ranauculo came out of the base of the daily, as from a feaf; and indeed the different pubfhefts of each was very diftinguifhable before their separation. A history of the whole is given by Mr. Kofig, in his Annals of Botany, v. i. 308, with a plate drawn for him by Joseph Banks by Mr. Bauer, and signed by all the witnefses.

Geffer published at different times eleven disftinctions in quarto, from 1750 to 1773, under the general title of "Phytographia Sacra." One of the latter ones are illuftrative of the plants of fcripture, the refl being of natural nature, containing various anatomical and phyfiological, as well as botanical and economical matter. He adopts the Linnaean fystem, and furnifhes many remarks concerning the sexual doctrine.

He meditated a very extensive work on the characters of plants, for which he had prepared a coniderable number of exquisifely engraved, though too much crowded, plates, some of which are in our hands; but this publication never took place.

He wrote also on extraneous foldil, and composed an index to Weimann's "Phytophragia," printed in 1761 in 8vo. A catalogue of his library for which he was published in 1759, by which it appears to have been one of the best collections of botanical books ever offered to the public. S.


Gen. Ch. Cal. Perianth of one leaf, superior, in five deep, acute segments, permanent. Cor. of one petal, incurved and recurved; tube thickish, with a contraction at the neck and a funnel-shaped throat; limb five-cleft, obvue, its upper segments conoeo, or crested, the three lower flat and spreading. Stam. Filaments four, mostly shorter than the corolla, two longer than the others; anthers arrow-shaped, simple. Pyl. German inferior, depressed, roundish; style thread-shaped, parallel to the filaments; stigma capitate. Peric. Capsule roundish, crowned with the spreading calyx, imperfectly two-celled, the partition being longitudinally interrupted.
interrupted in the middle. Seeds very numerous, minute.

**Geit** attached to the partition at each side.


Ohf. We prefer, with Linnaeus, the name Geoforia to Geforia, as the most correct in its construction, and supported by the best analogies, though Plamier originally wrote the latter. In such cases it is needless to baffle the reader with precise quotations, and we merely adopt the orthography that appears the best, except where there do any difference worth commemorating.

Linnaeus has given but three species of this genus, to which Swartz has added seven new ones, besides the Linnan Crambpera fructifica, in his Prodromus Fl. Ind. Occ. where he also made the Cyvilia of L. Heritier a Geoforia; see Cyvilia. But in his Fl. Ind. Oce. 1032 he submits to the opinion of those who reckon it distinct. All the Geoforia are of Weil Indian origin, and very little known in Europe, except the tanentofa, kept in botanic gardens for its rarity rather than beauty. Several of the species first described by Swartz are eminently handsome, and well deserve to be introduced into our flowers, especially his varietas, which bears tubular curved scarlet flowers, with projecting lamens, like some of the finest Erica. All the species are shrubby, except G. panula of Swartz, whose leaves resemble a Frizula or Arjuna, and G. acutilis of Linnaeus, Sp. Pl. 870. (Rapuncklo affinis, &c, Sloane Jan. v. 1. 102. f. 1.) both which are herbageous, and fearely rise above the ground. The leaves in all are simple, alternate, softly, thick, more or less crenate, toothed, or serrated, rough or smooth. Flowers corymbifer, mostly on a long common stalk. Corolla variously shaped in different species, but always more or less curved, from above one to two inches long. They chiefly grow in rocky, shady, mountainous places, in Jamaica, or in Hifpania. Full descriptions of all that Dr. Swartz has observed may be found in his Fl. Ind. Occ. v. 2. 1015—1031.

**Gesoriacum**, in Ancient Geography, a town of Gaul, belonging to the Morini; now Boulogne.

**Gesene**, in Geography, a town of Boeheim, in the circle of Boletus; nine miles N. E. of Turna.

**Gesserit**, Quamh. See Quamh. f. lew gersitis.

**Gesses** is the furniture belonging to a hawk. See **Jesses**.

**Gesti**: Francesco, in Biography, a favourite disciple and imitator of Guido Reni in the art of painting, some of whose works are little inferior to those of his master, and are often sold for his. He is generally known by a want of fulness of execution, and of energy in his actions.

**Gessico Point**, in Geography, a cape of Ireland, in the county of Sligo, at the northern extremity of Sligo bay. N. lat. 54° 22'. W. long. 8° 33'.

**Gesso**, a town of Naples, in Abruzzo Citra; 15 miles N. E. of Civera Borela.

**Gessofs**, a town of the state of Maryland, in America; eight miles E. E. of Fort William.

**Gessor**, a name used by some of the Arabian writers for galbanum.

**Gesta**, in Geography, a town of Sweden, in Weil Gotland; 23 miles N. E. of Uddevalla.

**Gestation**, Uterine, or utero-gestation, in Med. Wifery, the bearing or containing a fetus in the womb. See Inception.

**Gestation** is also a term in the Ancient Medicine, used for a fort of exercise, by us called carriage.

It consisted in making the patient ride on horseback, or in a chariot, or a boat; or even in rocking him in his bed, if he could not endure a more violent agitation.

Acelepiades first brought frictions and gestation into practice. The design of gestation was to recover strength, after a fever, &c. was gone.

**Geste**, in Geography, a town of France, in the department of the Mayen and Lorraine; 12 miles N. W. of Chollet.

Allo, a river of Germany, which runs into the Weser, near its mouth; called also Geife.

**Gesticulation**, the making of affected, indecent, or unfitting gestures, or even of proper ones in too great number. Gesticulation is a grievous fault in an orator.

**Gesten**, in Geography, a town of Switzerland, in the canton of Uri; 15 miles S. of Altorti.

**Gestrada**, a province of Sweden, about 51 miles long and 10 wide; bounded on the N. by Helsingland, on the E. by the Gulf of Bothnia, on the S. by Upland, Weifland, 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, lakes, and rivers. The capital of this province is Geife, which sea.

**Gestu et Fana**, in Laws, an ancient writ, where a person's good behaviour was impeached; now out of use.

**Gestungshausen**, or Gesellung 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.

Quintilian defines gesture, totius corporis motus & conformitatis. Gestures are a kind of natural language, which supplies the use of speech in those naturally dumb. The mimic and pantomimes were very great proficients in the style of gesture.

Gesture 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, at the voice should be suited 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 disfiguring 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.

Gesture 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 passion, 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; to hang it downwards on the breast, shews an unmannerly bashfulness and want of spirit; and to fix it on either shoulder, argues both and insolence; 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.
aversion, which is expressed by stretching out the right hand, and turning the head to the left. But nothing is more indecent than violent motions and agitations of the head.

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 turned 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 eye be kept in a fixed posture. Thus, in speaking on pleasant and delightful subjects, the eyes are bright and cheerful; but if they frown 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 resentment and disdain of Æneas:

"Illa solis occulos avera tenerat."

And lib. vi. ver. 469.

The eyes are also sometimes turned downwards, to express-modesty; and they should be always turned towards the object which is addressed. A gentle and moderate motion of the eyes is commonly most suitable, 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 says, great fires 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 desire with them, promise, call, dismiss, threaten, beseech, deter, fear, inquire, deny? Do not they express joy, sorrow, doubt, confidence, petition, menace, pleasure, number, and time? Do not they excite restraint, prove, admire, and blame? That in so great a variety of speech among all nations and countries, this seems to me the common language of mankind." (De Orat. lib. xi. cap. 3).

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 last; 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 gently laid on his breast. When no other motion is necessary, the hands should be kept about as high as the breast, to as to make nearly a right angle with the arm. They should never be suffered to hang down, nor to roll 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 explications of compliment, the motion of the hands should be gentle and slow; but in exhortations and applause, more swift. The hands should be generally open; but in expressions of composure and anger, they may be closed. Neither the breast nor the belly should be thruf 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 perforates another speaking: but here he should be careful not to exceed his part, by running into any ludicrous or theatrical mimicry, or changing his action or voice in a manner unsuitable to his own character. See farther on this subject, Ward's Oratory, vol. vi. p. 344. & c. p. 369. & c. Sheridan's Lect. on Elocution, lect. vii. p. 113. & c. See also Action, Imitation, Pronunciation, and Voice.

Gestus Bonus, in Lati. See Good a-bearing.

Getal, Septimius, in Geography, 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 Augustus. In the eighth year of his age he was moved with compassion at the fate of some of the partisans of Niger and Albinus, 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 effected, 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. Getal had not reached the twenty-third year of his age when he fell a victim to the brutality of his brother. Before his death, Severus had, in the anguish of a disappointed father, intimated that the weaker of his sons would fall a sacrifice to the stronger, who, in his turn, would be ruined by his own vice. (Herod. i. 20. 1.) See also the article Caracalla.

Getal, in Geography, a town of Sweden, on the N. coast of the island of Alan. N. lat. 60° 25'. E. long. 9° 50'.

Gete, or Geet, 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. vii.) that they had the same language with the Thracians, and he represents them as occupying those arid uncultivated plains which lie along the sea-coast between the mouths of the
GET

the Iber and that of the Tyrrhens, in which the army of Dar- 
rus, in its march against the Scythians, was in danger of per-
rishing for want of water. Pliny (i. iv. c. ii.) says, that
they inhabited that declivity of Mount Helmus which is
turned towards the Danube. Under the empire of Trajan,
the Getes were subjected to the Roman dominion. Herodotus
speaks of Zamolxis as the legislator of the Getes; and he
says that from him they derived the dogma of the soul's im-
nortality; and Trajan attributed to this principle the inter-
pidity with which they encountered death in the perils of war.

The Getes possessed only a small space along the coast, but
their territory extended to a considerable distance in the in-
terior of the country. Those who inhabited the western part
in ascending the Danube, were called "Dacians," but those
who were more appropriately denominated Getes, occupied
the eastern parts near the Exulian sea; and those who in-
habited the banks of the river Tyrrh, were called "Tyri-
getes." They had all the same language. These people
were continually intermixing themselves with the Scythians,
Balkarians, Sarmatians, Medians, and Thracians. The Getes
were without doubt the same people with those who were
called Gothis, and whose migrations were so extensive. See
Gothis.

GETTCHAO, a town of China, of the third rank, in
Chang-tong; 27 miles E.S.E. of Lu.

GETE, part of the country of the Eluts, in Chinefe
Tartary, so called even to the time of Timur, is regarded
by some geographers as the country of the ancient Maffa-
getas, towards the lakes of Palkati, Balkash or Tengis, and
Zaizan. The contafth, or great Khan, used chiefly to re-
side at Harcas, or Erga, on the river Il, which flows from
the S.E. into the lake of Balkash. See Jats.

GETHSEMAME, in Scripture Geography, a village in
the mount of Olives, whither Jesus sometimes retired,
and in a garden of which he endowed his agony, and was
taken by Judas. Matt. xxvi. 36, &c.

GETHYLIS, in Botany, (γήθυλις), an ancient
Greek name for some sort of pot-herb of the onion-tribe,
and is therefore well enough applied to this bulbous plant,
as it appears to be derived from γήθυλις, guity or jep, and
may allude to the beauty of its blossoms.) Thoub. Nov.
Sp. Pl. v. 2. 104, Mart. Mill. Diét. v. 2. 275, (Papi-
ria; Thoub. Act. Lund. p. 1. sect. 2. 117.—Chals and or-
Narceæ, Jaff.

Gen. Ch. Cal. none, except an obliquely truncated cylin-
дрical sheath. Car. of one petal, superior; tube very long,
thread-shaped; limb widely spreading, regular, in six deep,
elliptic-oblong, equal segments. Stamps. Filaments six, in-
ferred into the mouth of the tube, shorter than the limb,
often divided; anthers linear, vertical, rolled inwards, often
two to each filament. Pét. Germen inferior; style simple,
capillary, longer than the stamens; stigma capitate. Peric.
Berry club-shaped, obtuse, radical, sessile on the bulb itself,
several filiform, of one cell. Seeds imbedded in pulp, glo-
bose, smooth, lying over each other in a triple series.

Eff. Ch. Corolla with a very long thread-shaped tube;
limb in six deep segments. Berry radical, club-shaped, of
one cell. Seeds numerous.

Obf. Linnaeus, mifled by the occasional luxuriante of the
stamens, placed this genus in the clafs Decandria.

Four species are defined in Willdenow, besides his and
Jacquin's G. plicata, Hort. Schoenbr. v. 1. 42. t. 80,
which is Hypoxis plicata of Linnaeus, and we are at a loss
to discover why it is removed to Galbiya, for which no rea-
nion is given, nor does the description in Jacquin suggest any,
except the length of the tube. The fruit, when known
must decide this question.

41. t. 79, is a good example of the genus. The bulb is glo-
fuse, with a very strong tuberous base, and thick fibres.

Stamina. Lecyth, several, three or four inches high, linear,
obtuse, fringed, spirally twisted. Flower the height of the
heaven, green-white, the size of a daffodil.

G. fijlula, Gawler in Curt. Mag. t. 188, has a white
flower, externally purplish, and very narrow, flat, smooth
leaves. It is distinguished in that work from the original
G. offa, Linn. Sp. Pl. 639, 1753, as having an authority
of some specimens and drawings of the late excellent
Mr. Maffon, in the hands of Mefia Lee and Kennedy,
in which both plants are well defined. According to this
authority, G. offa is said to have properly twelve flaments.

Thunberg certainly confounded these two.

All the species of Galbiya have the habit of a Calceium;
but the berry, said to be very pleasantly scented and well-
tasted, is their striking characteristic. They are natives of
the Cape of Good Hope, rarely seen in our gardens, where
they do not easily blossom.

GETONIA, a name given by Dr. Solander, and, as we
presume, derived from γετονία, a yifecycle, but of its applica-
tion in the present instance we have no information. Roxb.
Coromand. v. 1, 61. (Calycoperis; Lamarck Illust. t. 357.)
—Chals and order, Decandria Monogynia. Nat. Ord. Holo-
baces, Linn. Eleagni, Jaff.

Gen. Ch. Cal. Perianth of one leaf, superior, deeply di-
vided into five equal, elliptical, obtuse, spreading segments,
permanent. Car. none. Stam. Filaments ten, shorter than
the calyx, inserted in two rows into the lower part of its seg-
ments, capillary, erect; anthers incumbent, roundish. Pét.
Germen inferior, ovate, furrowed; style thread-shaped,
shorter than the stamens; stigma simple. Peric. none, ex-
cept the cruf of the field, which is ovate, furrowed, crowned
with the larger withered calyx. Seed solitary, ovate.

Eff. Ch. Calyx in five deep segments, superior. Corolla
none. Seed coated, crowned with the enlarged withered
calyx.

1. G. floribunda. Roxb. Corom. v. 1, 61. t. 87.—Native
of forefists on the coast of Coromandel, where it was first
noticed by Kenné, flowering in February and March. The
flower is woody and climbing, with long, leafy branches,
downy like the whole plant. Leaves opposite, 
filament, ovate, acute, entire, about two inches long. Flowers
in axillary and terminal, compound leafy clusters, with op-
posite filaments, inodorous, greenish-white. Seed and perma-
nent calyx of a rusty hue.—The natives call this shrub Band-
mooroodoodoo.

We have no doubt of the propriety of Lamark's synonym,
which our lamented predecessor, the Rev. Mr. Wood, not
knowing the Getonia, could scarcely ascertain. (See Ca-
lycopera.) If we be right, the main branch in La-
mark's plate is diminished, the separate fruits only, and
permanent flaments, being of the natural size.

GETTYSBURGH, in Geography, a small poft-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 Monocacy; containing about 300 houses; 9 miles N.
of the Maryland line, and 118 W. by S. from Philadel-
phia.

GETZENDORFF, a town of Austria, seated on the
river Raisenpach; 12 miles S.E. of Vienna.

GEVASI, a town of the Arabian Trak, on the Tigris;
95 miles S.E. of Bagdad.

GEVAUDAN, a mountainous country of France, so-
called
called 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.

GEUL, a river of France, which runs into the Meuse, about 5 miles below Maerdrich. — Allo, 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. Ambrosius confectures that it comes from rras, to be spangled, because its beautiful flowers and seeds are the boast and glory of the Alps. — Avens, or Herb-bennet.— Linn. Gen. 256. Schreb. 543. Willd. Sp. Pl. v. 2. 1113. Lamarck. Illust. t. 413. Mart. Mill. Dict. v. 2. Sm. Pl. Brit. 554. Jut. 358. Gaertn. t. 74. (Caryophyllata; Tour. t. 151. Lamarck. Dict. v. 1. 396.) Chaff and order, Neu- fandria Polygynia. Nat. Ord. Simifera, Linn. Juss. Jaff. Gen. Ch. Col. Perianth of one leaf, in ten segments, rather upright; the alternate segments very small, acute. Petals five, rounded; claws narrow, of the length of the calyx, into which they are inserted. Stem. Filaments numerous, ovate, of an equal length with the calyx, and inserted into it; anthers short, broad, obtuse. Petals yellow, numerous, collected into a head; filaments into the side of each gamer, hairy, long; stigmas simple. Parent none; common receptacle of the seeds oblong, hairy, placed on the reflexed calyx. Seeds numerous, compressed, rough; each tipped with the long gigantic style.


Seeds with a jointed awn. Receptacle columnar.

Only five species of Geum are described by Linnæus in the last edition of his Species Plantarum, though in Willdenow's edition we meet with eleven of this genus, of which number G. urbannum and ricola are the only British ones, and to which we are enabled, by the assistance of Dr. Smith, to add two or three others from his herbarium.


2. G. ricola Water Avens. Linn. Sp. Pl. 717. Eng. Bot. t. 1566.— "Radical leaves lyrate. Stipulas ovate, acute, cut. Flowers drooping. Seeds twinned and feathery. - Found in meadows and moist woods more commonly than is usually imagined, perennial, flowering in June and July. Rest spreading, woody, aromatic, sometimes of use in intermittent fevers. Stem about a foot high, drooping at the top. Leaves lyrate, or confundly pinnate, serrated, hairy. Petals erect, never fully expanding. The general appearance of this elegant species, an universal favourite amongst botanists, is thus truly described in English Botany, "the rich combination of the dark-green wrinkled leaves, with the glowing red-brown of the flower, and calyx, and singularly delicate colour of the petals, added to the graceful position of the flowers, render this one of the most picturesque of our native plants."

3. G. virginianum. American Avens. Linn. Sp. Pl. 716. (G. camadene; Jacq. Hort. v. 2. 82. t. 175.) — "Stems Vol. XVI. leaves ternate; the upper ones lanceolate. Stipulas oblanceolate. Flowers erect. Seeds of the seeds hooked. — Native of North America, from whence it was introduced by Mr. P. Miller in 1753. It is nearly allied to habit in G. urbannum, but the petals, which are shorter than in calyx, are white, and the whole plant is of a greener hue. Its leaves are also more attenuated towards the base. It flowers in June, and is a hardy perennial. Roat inodorous. Radical-leaves generally bipinnate. Seeds smooth.


6. G. montana. Pyrenean Avens. Willd. Sp. Pl. v. 2. 1115. (Caryophyllata pyreniae, amplexica et rotundicri folio, mutantes flore; Tour. Linn. 295.) — "Flowers drooping. Petals shorter than the calyx. Seeds hairy, twined at the base." — This is taken up by Willdenow from Tournefort, and is perennial, found on the Pyrenees. Its appearance is similar to G. ricola, but differs in the large size of its radical leaves, and shape of its awn, which are thinly covered with hairs, and naked at the top. Stem erect, about a foot and half high. Seeds very woolly.


9. G. montana. Great Mountain Avens. Linn. Sp. Pl. 717. Jacq. Auffr. v. 3. t. 575. — "Leaves pinnate, hairy; the outer leaflet very large; round; the lower ones regularly decreasing. Stem single-flowered. Awns upright, hairy. — This, and the following species (G. reptans) are found most abundantly on the highest alps of Austria and Switzerland, where they are extremely ornamented during the months of July and August. Mount Cenis is described by travellers as a favourite habitat of these beautiful plants. The root of G. montana is fibrous, aromatic, and somewhat aromatic. Stem round, leathery, from three to four inches to a foot in height, erect, generally single-flowered, simple. Petals roundish, yellow, longer than the calyx. Seeds oval, brown, with a long feathered awn.


G. aurantiaca. Species with broad, fleshy leaves. Stem single-flowered. Axils of leaves, hairy. —Hawaii, where it is native.

11. G. aemoneoides. A. & C. Arvensis. Wild. Sp. Pl. v. 2. 1177. — "Leaves pinnate, smooth; leaflets wedge-shaped, toothed at the top. Stem single-flowered. Axils of leaves, hairy. —There is no figure of this rare species extant. Willdenow has very properly reduced it to Geum, though the plant was previously known as Dryas pentapetala. (Linn. Sp. Pl. 717.) Native of Kamtschatka. Root perennial, throwing out filiform, fleshy creeping. Stipulas narrow. Petals five, large, round, white, spreading. Seed numerous, tipped with an hairy awn, and longer than the flower. It appears by the Linnean Herbarium to be a very elegant species.


13. G. calvijjum. Marsh-marigold-leaved Avens. —Radical leaves kidney-shaped, almost circular, sharply crenate; on slightly leafy stalks. Calyx turbinate, with lanceolate segments. Axils hairy. —Gathered by Mr. Meezies on the west coast of North America. This is remarkable for the resemblance of its radical leaves in shape and size to those of Caltha palustris, except their being slightly hairy, and their long foot-stalks being furnished with a few small oblong or three-lobed leaflets, indicating an approach to a lyrate leaf altogether. Stem above a foot high, erect, bearing three or four smaller, fleshy rounded leaves, more deeply crenate or cut, and terminating in about three flowers, on slender stalks. Calyx hairy at its base, turbinate; its segments oblong-lanceolate, obtuse, at length crenate, the larger ones equal in length to the petals which are yellow and broad, like those of a common Crowfoot. Axils straight, bluish, hairy in the lower part, possibly becoming hooked at an advanced period.

Geum urbanum, in the Materia Medica, is a common British plant, called Avens, in woods and hedges, flowering from May till August. The root, which is the part medicinally employed, has an aromatic and somewhat astringent taste, and a pleasant smell of the clove kind, especially when it is produced in dry and warm soils. It gives out its astringent matter equally to water and spirituous menstrua; but its aromatic part most perfectly to the latter. In distillation with water it yields a small quantity of a bituminous oily matter, of a very grateful fragrance. This plant, though little used in Britain, is held in great esteem for various virtues on the continent; but the character, under which it has been received since the year 1760, is that of a febrifuge; many infancies having been assuaged by its efficacy in obstinate intermitments, after the Bovian bark had failed. It is said that a tincture of the root, 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 astringent; and experiments made by Buhlehave evince its antiscptic power to exceed that of Peuvian bark. Woodville, Med. Bot.

GEVOLLING, 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 district of Dijon; 7 miles S. of Dijon. The place contains 1128, and the canton 7894 inhabitants, on a territory of 260 kilometres, in 46 communes.


GEUSS, JOHN MICHAEL, in Biography, was born in Holstein in 1745. 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 Contracting Mines," in the composition of which he was assisted by the MSS. of Behlor, 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 Contracting Mines." He gave a translation in the German language, from the Danish, of Olufsen and Povelsen's voyage to Iceland, which was printed in two volumes 4to. He lent several valuable papers to Bretin's, Ingenieur-und-Artillerie Magazin, and published a set of logarithmic tables.

GEUTZ, in Geography, a town of Austria, in the duchy of Anhalt-Coten, near Cotten.

GEWICZE, GEWITZ, or Gzwiff, a town of Moravia, in the circle of Olmutz; 24 miles west of Olmutz. N. lat. 49 45. E. long. 16 35.

GEWOLD, CHRISTOPHER, in Biography, flourished in the seventeenth century. He was one of the acute counselors 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 mention "Genealogia Serenissimorum Bohemorum Ducum, 1605," "Chronicon Monasterii Reicherspergen.", "Delivatio Norici veteris, ejusque Confiniun," and "Commentarius de Septem virutu Romanorum Imperii." Morelli.

GEX, in Geography, a small territory of France, in the cidental province of Burgundy, extending from Port d'Echalde to the village of Croissy, and from the town of Gex to Geneva, being seven leagues in length and three in breadth.
breadth, 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 2,401, and the canton 9,209 inhabitants, on a territory of 212½ square miles, 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 W. S. W. of Wolkenstein.

GEYERSBERG, a town of Bohemia, in the circle of Königigratz; 28 miles E. N. E. of Chrudim.

GEYRACH, a town of the duchy of Styria; 9 miles S. S. W. of Cilley.

GEYS, or GEYS, a town of Germany, in the bishopric of Fulda, situated on the Ulster; 15 miles N. E. of Fulda. N. lat. 50° 43'. E. long. 10°.

GEYSS Rucken Jaffelick, 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 Meissen; 12 miles S. E. of Plzinzt.

GEZAEL, a town of the Arabian Irak, on the Ephrathas; 120 miles W. N. W. of Basfora.

GEZAN, or DESAN, a sea-port town of Arabia Felix, in the principality of Abu-Arifch (see Abu-Arinfch); 23 miles W. of Abu-Arifs, the capital of the principality. This province of Gezan, situated on the Arabic gulf, and in a fertile country, carries on a considerable trade in fennas, of which great plenty is furnished by the circumjacent territory, and also in coffee, which is brought hither from the mountains of Hafchid-u-Bakil. It has a trade likewise with the ports on the opposite side of the Arabic gulf; but has no intercourse with the inhabitants of the Inam.

GEZEID, a town of Egypt, on the right bank of the Nile; 72 miles N. N. W. of Cairo.

GEZIRA, or JASSEERA, 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. 42° 42'.

GEZIRA CUBROS, in the Medin Medica of the Ancients, a name given to tale by Avicenna, Serapion, and others. These authors do not give any explication of what sort of substance they mean by this name, but seem to suppose it a thing universally known, and only give a lift of its qualities.

GEZIRAT AL DAIHB, or GEZIRAT IDDEHAB, or the Golden Island, in Geography, an island in Lower Egypt, formed by canals cut from the left bank of the Nile, opposite to Finsa.

GEZIRAT AL TEB, or Island of Birds, an island in the Red sea. N. lat. 22° 18'. E. long. 47° 56'.

GEZULAT, or GEZULA, an inland province of the empire of Morocco, E. of the province of Sus, and N. of the coast of N.; this, together with the province of Draa, 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, spicery, horses, and other necessaries. It has every year a fair, which lasts two months, for the sale and exchange of cattle and merchandise in general. The people are free, being allies rather than subjects of Morocco. Their arms consist of sabres, large hoop two-edged swords and lances. They are numerous, but have no towns, and they generally live in camps and villages.

GFOLL, a town of Austria; 8 miles W. N. W. of Graz.

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 shew the place where it stood, and the inhabitants are only provided with dates, and the milk and flesh of a few sheep; 20 miles S. of Hodeida.

GHALCHULIVA, in Zoology, the Ceylonese name of a species of East Indian serpent, a snake of a pale brown, variegated with transverse breaks of white, and found among rocks and stones.

GHAN is a name given in Meccosy to caravanserais.

GHANA, as Edri or Abuflada call it, or Ghinar, in Geography, a city and capital of a kingdom in Africa, situated nearly midway between the Indian sea and the Atlantic ocean, or the E. and W.; and between the Mediterranean and the Ethopic seas on the N. and S.; and, therefore, considered as major Renell as the point on which the central and eastern positions depend. This country lies on the borders of the Nile-Abled, or Guin river, and is bounded on the N. by Caufina or Kaffina, on the E. by Wangara, on the S. by Melli or Lamement, 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 Edri, Ghana is distant 37 journeys (each day's journey of Edri being about 19.60 geographical miles) from "Gerna," through Agadez, or Agadoff. Ghana is an ancient and ruined city of Fezzan, as much, about four journeys E. S. E. of Mommrik, in N. lat. 27° 25'. E. long. 16° 20'. Agadez is 25 of Edri's journeys from Gerna, bearing S. by W. or S. S. W. from the capital of Fezzan. Ghana is 12 days of Edri's foot to the southward of Agadez, or about 229 geographical miles. It appears that Ghana lies somewhat to the eait of the line which passes through Agadoff from Genna to Ghana, and Mr. Rennell has taken 700 as the general line of distance from Genna to Ghana. Mr. Matia was told, at Morocco, that Ghinny (Ghana) was 40 journeys from Kabra, the port of Tumbidto, along the bank of the Niger. These, taken at the caravan rate when traversing the desert between Fezzan and Egypt, Morocco and Jarma, &c. that is, at 163 per day, produce 657 geographical miles. The interjection of this line with that from Genna places Ghinny in N. lat. 16° 10'. E. long. 15° 23'; in which position it stands at 760 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 Rennell's Proceedings of the African Association, p. 119, &c.

GHANARA, a city of Africa, the capital of Wangara, situated on a river, which runs into the Niger, or rather into a lake (the Lybia Palus of Ptolemy) formed by the Niger. N. lat. 15° 40'. E. long. 15° 40'.

GHAASSA, or GASSA, capital of a district in the northern part of Boten, in the East Indies, and the residence of a zamoon, or provincial governor. The highest mountain in its neighbourhood, whole head is eternally covered with snow, sends forth a spring of water at its base of great degree of heat, that few are found capable of bearing, even for a short time, any part of the body immersed in it. It is situated near the spring-head of Pa-chenu river. N. lat. 27° 53'. E. long. 89° 19'.

GHAT,
GHEAT, a small island in the river St. Lawrence. N. lat. 45° 20'. W. long. 93° 20'.

GHAHARI, a town of Persia, in the province of Iracl: 27 miles E. of Ispahan.

GHEBARABA, a town of Persia, in the province of Iracl: 5 miles N.W. of Ispahan.

GHEBAN. See Gihan.

GHEBAN, a town of Persia, in the province of Iracl: 7 miles N.W. of Ispahan.

GHEBAI, a town of Italy, in the department of the Mela: 10 miles S. of Brescia.

GHEDEMIS. See Gadamis.

GHEDEL, a town of Asiatic Turkey, in the government of Sivas: 15 miles S. of Amaceh.

GHEDEMAN, a town of Persia, in Chorasan; 18 miles S. of Herat.

GHEIRA, a town of Asiatic Turkey, in Natolia; 38 miles N.N.E. of Mogha.

GHEIVE, a town of Asiatic Turkey, in Natolia; 20 miles E.N.E. of Hnik.

GHEL, a town of Arabia, on the coast of the Red Sea, anciently called " Ocilius": 48 miles S.S.E. of Mocha.

GHELEN, Salaryn, 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 published, through Laud, and made himself known to Erasmus, at whose recommendation Froben 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 Pliny and Livy. He translated from the Greek into Latin the Antiquities of Jofephus, some Homilies of Chrysolom, 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 Jullin 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 placid, simple and sincere. Moretti.

GHEMARA. See Gemara.

GHEMA. In Geography, a town of Italy, in the department of the Cegna: 13 miles N.N.W. of Novara.

GHEMISH, a town of Asiatic Turkey, in the government of Sivas: 24 miles W. of Amaceh.

GHENNA. See Ghinna.

GHEGNT, a city of France and chief place of a district, in the department of the Scheldt, formerly capital of Audirand Flanders, situated on the conflux of the rivers Scheldt, Lys, Moeze, 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 225 square kilometres, in two communes; the second, or south, contains 15,000, and its canton 16,469 inhabitants, on a territory of 35 square kilometres, in two communes; the third, or east, includes 13,000, and its canton 16,073 inhabitants, on a territory of 35 square kilometres, in three communes; and the fourth, or west, contains 13,000, and its canton 18,319 inhabitants, on a territory of fifteen kilometres, in three communes. This city was first chos for their habitation by the Nortiv, 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 Odowec, grand-terror of Flanders, and has since been frequently enlarged, particularly in the year 1297, 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 fangurious slaughter. Ghent was the birthplace 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, chastised 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 their 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 some small portion of its ancient splendour, and became, at least previously to times of recent confusion, considerable. In November 1676, was concluded in this city the famous treaty called the "Treaty of Ghent," containing 25 articles, and amongst others some of them stipulating 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 secure; and this treaty was approved and ratified by Philip III., King of Spain. In 1678, Ghent was taken by Louis XIV., king of France, but restored to Spain at the treaty of Nimeguen 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 IV., 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 cloth, linen, lace, and silk manufactures, and is much aisiected, in favourable times, by two navigable canals; one to Sas-de-Ghent, and another to Bruges, Oostend, &c. The magistracy consists of burgomasters, echelons, and common-council. John, the third son of Edward II., King of England, was born in this city, and from this circumstance called John of Ghent. In November 1792, the French took possession of this city, but evacuated it on the retreat of Dumourier; however, they afterwards regained it in their progress through the country: 58 miles S.W. of Antwerp. N. lat. 51° 15'. W. long. 3° 45'.

GHER, a town of Africa, in the country of Sugulmeffa, or Sigulmeha, on the Ziv, near mount Atlas; 90 miles N.W. of Sugulmeffa.

GERANGOL, a town of Africa, in the country of the Foulahs, on the S. side of the river Senegal. N. lat. 16° 40'. W. long. 14°.

GERÈDE, a town of Asiatic Turkey, in Natolia; 28 miles E. of Boli.

GERHISTEN MOUNTAINS, a chain of mountains of Aifa, situated on the N. of the country of Candahar, 15 miles N. of Candahar.

GERHONG, or KIRKANU, a town of Aifa, and capital of the country, on the Degoo, 150 geographical miles.
GHEZ, a town of Grand Bucharistan; 24 miles S.S.W. of Balk, N. lat. 36° 16'. E. long. 65° 42'.

GHEZAN. See GEZAN.

GHEZERI. Pier Leone, called Cavalier Geszi, in Biography, a painter who was a pupil and imitator of Pietro Corriva. 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.

GHEIUND, in Geography, a town of Bengal; 25 miles S.S.W. of Goragut.

GHEIMINS. See GEIMINS.

GHEKERS, an appellation given to those who inhabited the northern and largest division of the hilly tract situated between the Bhum, the Sindre, and Cusimere, in Hindostan, by way of contrast to the Jondis, 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 Burboom, and on the S.W. by Curruckdeel and Moy. The chief place is Ghidore; which is 70 miles S.E. of Patna. N. lat. 24° 53'. E. long. 86° 23'.

GHEIZ, a fortress of Peria, in the province of Irak, taken by the Afghans in 1723.

GHILAN, or KILAN, synonymous with the ancient Gelb, a province of Western Persia, bounded on the N. by the provinces of Aderbijian or Aderbeiztan and Schirvan, on the N.E. by the Caspien sea, on the E. by the Caspien sea and the province of Mazanderan, on the S. by the Perisan Irak, and on the W. by the provinces of Aderbijian and Curdistan; about 200 miles from E. to W., and 150 from N. to S. This is one of the most beautiful and fertile provinces of Peria, 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 Peria and Armenia. The manufactures and silk of Ghilan are esteemed the best in Peria, and have been in such repute for many years, that Roshd, its capital, is become one of the first commercial towns in this part of Asia. The inland fort is usually white, and chiefly built into the interior cities of Peria, or fold to the Turks; the inferior kind is yellow, and principally disposed of to the Russians. Roshd supplies the bordering provinces of Persia, and the independent neighbouring states, as far as Georgia, with European merchandise, except the goods which are transported immediately from Atarak, through Kilar and Moffok, to the nearest part of Georgia, and of the neighbouring mountains; and those sent from Shanakoo to the League Tartars, 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 Caspien Sea and Persia.

We shall here only add, that in the year 1792 Akau, called by Dr. Pallas Aga Mamet, collected an army, and purposed his conquests in the vicinity of Gilian, till at length he had...
no rival, except Hidast, khan of Ghilan, whom he forced to fly from Rashid or Rashid, his place of residence, and who was killed near the port of Saleh. In consequence of these events Akin became monarch of the whole of Western Persia; and having been made a eunuch in his infancy by order of Naser Shah, he nominated for his successor his nephew Baber Serdar.

GHILDJ, a town of Africa, on the Senegal; 30 miles N.W. of Gallam.

GHILON, a town of CurdiJian; 50 miles S.S.W. of Erbil.

GHINNA, 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, itsSorice with five pointed spreading teeth. Cor. of one petal, irregular; tube long, narrow; limb of two lips, the upper one large, rounded, concave, ascending; lower in three deep roundish segments, the middle-mottl longer, deflected, emarginate. Stam. Filaments four, inserted into the tube above its base, two of them longer than the rest; anthers each of two separated oblong cells, one of them terminal, fertile in the longer filaments only, the other like a little scale in the middle of each filament. Pod. Germen roundish, superior; style thread-shaped, the length of the tube; stigma four-lobed. Peric. Drupe turbinate, angular, dry, projecting beyond the permanent calyx. Nut angular, of four or five cells. Seeds solitary. Eff. Ch. Calyx with five sharp spreading teeth. Corolla ringent, two-dipped; the lower lip three lobed. Nut coated, four-celled, involuted with the calyx. Seeds solitary. Anthers of two dilate lobes.

Obs. We think this genus ought to be placed in Diilynaia, along with Verbena, to which it is nearly akin, though only the larger flowers appear to be perfect; but this may be variable, and cannot well be determined without repeated examinations of wild specimens.

1. G. spicata. Wildl. n. 1. Ait. Hort. Kew. ed. 2. v. 1. 459. (G. verbena; Sw. Ind. Occ. v. 2. 1869. Verbena curassavica; Linn. Sp. Pl. 28. Veronica fimus, &c. Herm. Parad. t. 240.)—"Fruit with four thorns. Leaves smooth."—Native of several parts of the West Indies, where Houkton 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 whith flowers.

2. G. mutica. Wildl. n. 2. Sw. Ind. Occ. v. 2. 1900. (Tamonea spicata; Aulb. Guian. 650. t. 268.)—"Fruit without thorns. Leaves downy."—Native of Guiana and Cayenne. Much like the former, but with downy leaves, and an 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 Nove, though perhaps they might be planted out for the summer, if desirable, like other tender annuuals.

GHINNA, or GHENNE, in Geography, a town of Egypt, on the E. side of the Nile, opposite to Kufa, or Koptos, on the other side, and distant from Cairo, on the Red Sea, about 90 geographical miles. N. lat. 26° 11'. E. long. 32° 45'.

GHINE, a town of Asiatic Turkey, in Notoria; 24 miles N.W. of Sinob.

GHO. See KEMLINK.

GHO, a town of Africa, belonging to the Foulahs, on the Senegal; 12 miles S.W. of Goumel.

GHIR. See GIRL.

GHIRGUNG. See Ghirguin.

GHIRLANDAIO, DOMENICO, in Biography, a painter, of whom Vafar speaks as being of the first rank in his time. His real name was Corradini. 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 garlands (Ghirlandi) for children to wear. Domenico continued to paint, after he had adopted painting as his profession, for the churches and convents 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 characteristic appertaining to the subject, than had hitherto been done there; and he was the first who left off gilt ing pictures, and attempted to imitate its effects by colours. He was called to Rome by Sixtus IV. to affix other masters 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, finished many of his works, and educated his son Ridolfo to the art, who afterwards made great progres, and obtained efeem 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; the composition, the vivacity of the face, the choice of colours, something ideal in the use of nature, betray similar maxims, with inferior powers." He died in 1565, aged 75.

GHIRNAH, in Geography, a river of Hindoostan, which runs into the Taptus; 36 miles S.W. of Burhanpur.

GHISCOLA, a town of Italy, in the department of the Upper Po; 15 miles E. of Cremona.

GHISTELLES, a town of France, in the department of the Ais, and chief place of a canton, in the district of Bruges; 11 miles S.W. of Bruges. The place contains 2500, and the canton 11,754 inhabitants, on a territory of 1821 kilometres, in 18 communes.

GHIVIRA, a town of Italy, in the department of the Orona; 30 miles N.W. of Milan.

GHIZNI, or GIMNA, an ancient empire of Hindoostan, founded by Abulfajr, son of Korfan, A. D. 960, who revolted from the king of Buharistan. Ghizni confirmed chiefly of the tract which composed 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, subject to the fame causes of decay with other unwieldy fates of rapid growth, was, in 1153, forcibly divided; the wether and largest part, and which held retained the ancient name of the empire, being feized on by the family of the Gauries, (so demoted...
Lahore. 

G I A

GHIZNI, or GAZNA, a city of Candahar, once the reputed capital of the Ghiznian empire, and placed among the western Sources of the Indus, and not far from the Indian Caspian. The position of Ghizni is erroneously 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 personages whose remains have been interred there. Wonderful stories are related concerning its extent and population in ancient times; nevertheless, Baber expresses his surprize 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 1679 miles from Candahar, and about 88 miles from Bannian.

N. lat. 33° 55'. E. long. 68° 22'.

GHOBAN. See GORBAN. 

GHOER, a town of Holland, in Overijssel, on the 
Rigge; 10 miles N. E. of Berkelo.

GHIR. See GAUR.

ghORAB, a town of Arabia, in the country of Ye-
men; 15 miles E. of Tarno.

GHOUP, a mountain of Southern Africa. This, and
also Nieuweld, are a continuation of the Roggeveld moun-
tain, and join the divisions bearing the same name in the
district of Graaf Reynet. They have lately been defeated, on
account of the number of Boisfretman hotentots, who
dwell-chief behind them.

GHOUBUND, a town, and district of Cabul; 42
miles N.W. of Cabul. N. lat. 34° 55'. E. long. 67° 52'.

GHOURLI, a town of the kingdom of Balk. N. lat. 35°
40'. E. long. 66° 36'.

GHIULE EL ALIAH, a town of Arabia Felix; 10 miles
NNE of Chaimir.

GHIULPAYGAN, a town of Persia, in the province of
Iraque, taken by the Afghans in 1723; 100 miles N.W. of
Ispahan. N. lat. 35° 45'. E. long. 50° 40'.

GHUMISCHAN, a town of Asiatic Turkey, in the
government of Trebifond; 50 miles S.S.W. of Trebif-
ond.

GHUNFEDE, a sea-port of Arabia, on the Red Sea,
belonging to the shereff 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. 20° 7'.

GHUN, one of the smaller Cape Verd islands, being
little more than a rock.

GHURMAN, a town of Persia, in Segellian; 30 miles
N.E. of Perah.

GHYASPOUR, a town of Hindostan, in Bagh; 20
miles W.S.W. of Chuprah.

GIA, an Italian adverb, used in Music for already,
formerly, andante; as "Gia maestro di cappella del Duomo
di Milano," former maestro di cappella, or composer, to
the cathedral of Milan.

GIABBAR, in Geography, a fortress of Asiatic Turkey, in
the province of Diharibekir; 120 miles S.S.W. of Diarbekir.

GIACOMI, in Geography, of Parma, compassed for the theatres of Venice, between the years 1704
and 1726, seven or eight different dramas, written chiefly by Apostolo Zeno and Metastasio. He was the scholar of Cappelli, 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 Vini and Haifi.

GIACOMO, St., in Geography, a town of Italy; three
miles S. of Verona.—Alto, a town of the Valtelin; two
miles N.W. of Chiavenna.

GIACOMO, St., a valley of, a valley of Switzerland, which
is part of the county of Chiavenna. 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 prefer the inhabitants from the oppre-
sion which their neighbours endure. All smokes are tried in
the valley. The criminal statutes are those of Chiavenna, with
this difference, that instead of the assessor, the valley chooses
four personas, who are always present at the examination;
and without whose concurrence, torture cannot be inflicted,
or sentence passed. The valley has its own code of juri-
prudence, 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 patura, mixed with large groves of
fir and pine.

GIACOMO, St. AEGIS, in Geography, a mountaineer, and a disciple of Julquin, enumerated by Adam among
the fingers and composers of the pontifical chapel in the 16th
century. He was maestro di cappella some time to the
princely of Lorrain, and had acquired great fame by his madri-
gals, of which he published at Venice, between the years
1339 and 1375, five books. In one of which the celebrated
madrigal, "Il bianco e dolce Cigio cantando moare," which was
in high favour all over Europe.

GIADEN, in Geography, a town of Arabia, 60 miles W.
S.W. of Mecca.

GIADILA, a town of Arabia, in the province of
Neda-ed, 90 miles S.W. of Karbistan.

GIADRI, a town of Albania, on the Drino; 86
miles N. of Alege.

GIAGAS of Africa. See JAGAN.

GIAGH, or JEHUG, a cycle of twelve years, in use
among the Turks and Cathayans.

Each year of the gagh 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 hawk; the ninth, of a monkey; the tenth,
of a hen; the eleventh, of a dog; and the twelfth, of a hog.
The are divided the day into twelve parts, which they
call gaghls, and distinguish them by the name of the same
animals. Each gagh contains two of our hours, and is di-
vided into eight Kats, as many as there are quarters of hours
in our day.

GIALAKOVA, in Geography, a town of European
Turkey, in Romania; 60 miles N.E. of Filippopoli.

GIALLOLINO, in Natural History. See NAPLES.

GIAMANI,
GIAMANI, in Geography, a town of Perse, in the province of Chufilian; 28 miles S.S.W. of Suffer.
GIAMBASH, a town of Affiaci Turkey, in Natalia; 22 miles S.S.E. of Smyrna.
GIANAH, a town of Perse, in the province of Kerman; 55 miles E. of Simgan.
GIANCABIO, Sr. a town of Naples, in the province of Otranto; 12 miles S.W. of Brindii.
GIANNONE, Petron, in Geography, was born at or near Naples about the year 1607. He was educated for, and practiced in, the law, but was much more distinguished as an historian. In 1722, he wrote a "History of Naples," in four volumes. The style is pure, but the freedom with which he discussed several topics relating to the origin of the papal power gave too much offence to the court of Rome, that he was obliged to emigrate from his native country. He found an asylum in the court of Sardinia, which, however, dared not to allow himself his protector, but chose rather to represent his situation as that of a prisoner. Giannone died in Piedmont in 1745. Extracts from his history were afterwards printed in Holland under the title of "Aneideses Ecclesiasticæ." His posthumous works were given to the world in a quarto volume, containing, among other miscellaneous matters, his profession of faith, and a justification of his history.

GIANOTTI, a performer on the double-bass, in the opera at Paris, from the year 1739 to 1767, who published, in 1759, a treatise on the principles of Ramas, entitled "Guide du Compositeur," the Composcr's Guide; a work much esteemed by the followers of Ramas. The author of this treatise having been long in the practice of explaining the fyltem of the fundamental base to his scholars, has drawn up his own work in a clear and intelligible manner.

GIANNUTTI, in Geography, a small island in the Mediterranean sea, near the coast of Italy. N. lat. 43° 24', E. long. 11° 20'.

GIANT, 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 faced and profane, furnish various instances of them; a great part of which naturaflis and antiquaries find absurd.

Thee among the ancients who spoke of giants, as historians, and affirms there were seven beings, are Caesar, de Bello Gallico, lib. i. Tacitus, de Morib. Germanor, and Annal. lib. ii. Florus, lib. iii. cap. 3. St. Augustine, de Civit. Dei. lib. xv cap. 9 and Saxo-Grammaticus, at the end of his life: among the moderns, Hiera, Magnes, Mifcalan, de Gigantibus; Chaffagonus, de Gigantibus; Kircher, Mund. Subterr. lib. viii. feé. ii. cap. 4, and to many others, that Stephenus, in his notes on Saxo-Grammaticus, affirms, nothing can be more extravagant than to deny or allegorize the authorities we have concerning them.

Dr. Derham 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 vary about them, some taking them for monsters of impiety, atheism, rapine, tyranny: as to thefe, Numb. xiii, who were evidently spoken of as men of a gigantic size, it is probable the fables which may add to their bulk.

Be this as it will, it is manifested, that in both these places giants are spoken of as rarities and wonders of the age, not of common nature; and such instances 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 that 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 the work of Thesibocules, who is said to have lived up from 1615, and to have been higher than the trophies, and twenty-six feet in height, and even more. But no better we suppose the giants to have been, of whom Solomon gives an account in his fifth book; such as Harthen and Starchater, among the men; and among the women, "reporta eift (faith he) puella, in capite vulnerata, corrupta, induta chlamys aurea, longitundinibus cubitum 50, latitudinis inter humeros quantor," Old. Mag. Hift. lib. v. cap. 2.

But, as for the more credible relations of Gellius (whose height was six cubits and a span, i. Sara xv. 4.), which, according to bishop Cumberland, is somewhat above eleven feet, English, of Or, king of Bahan, (Deut. iii. 11.) whose head 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 Skelton, dug up in the place of a Roman camp, near St. Alban's, by a man inherited Marcus Antoninus, of which an account is given by Mr. Cheeselden, who judged, by the dimensions of the bones, that the person was eight feet high, Phil. Trans. N. 334; these antique examples and relations, we say, may be mistaken, may exist, with modern ones; of which we have divers in J. Ludolph. Comment. in Hist. Zeith. lib. ii. cap. 2, Magnus, Corningus, D. Hakewel, and others; the last mentioned writer speaks from names, 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. 258. 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 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 predecessors are treated as timid or boasting fabulists. The Yena Garecillo de la Vega, in his history of Peru, relates, that according to a tradition universally received, a number of vessels or junks 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 proportionally large. But these are fables, similar to those relative to the same subject in other parts of the world. See GIANT'S homes.

Turner, the naturalist, reports, that he had seen, near the river Plata, on the coast of Brazil, a race of giants, who went dark naked, one of whom was twelve feet high; but he acknowledges that he saw no others to talk. The ocular witnesses on the affirmative side of the question are, Magellan, Lisboa, Sarmento, and Noddal, among the Spaniards; Cavendish, Hawkins, and Knivet, among the English; Sebald, De Noort, Le Maire, and Spilborn, among the Dutch; and among the French, those who went in the expedition from Marseilles and St. Mabes, in the year 1704.

Knivet affirms that he measured several dead bodies, which he found buried at Port Deire, 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 allowed him, that they had seen many men of the same gigantic stature upon the coasts of the Irait; this account is also confirmed by Sebald de Weel, and Oliver de Noort. Ari: Chas.
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Clifz, a commissary on board Le Maire's fleet, declares that he found, in the sepulchres on the coast of Patagonia, the bones of men who were between ten and eleven feet long. Nodal and sir Richard Hawkins merely relate, that these savages 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 Hermitz, 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 savages 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. Prevost 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 Cauchois, who some illnes 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 eastern 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, fearfully inaccessible 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 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 five 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 fix feet five and fix feet six inches, and one who was fix feet seven inches. Captain Carteret, who attended captain Wallis on this occasion, confirms the above account in his letter to Dr. Marty. See Phil. Trans. vol. 18. art. 2. p. 26, &c. See Hawkinsworth's Voyage, vol. ii. Intro. and p. 28. 154.

GIANTS, in Ancient Mythology, were the sons of Terra, or the Earth, by Cetus, 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 polished of strength proportioned to their bulk: each of them had a hundred hands, and serpents instead of legs. Being determined to dethrone Jupiter, they reversed 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 affiance of some mortal, with the advice of Pallas he called up Hercules, and with the aid of this hero, extirpated the giants Enceladus, Polybotes, Alecton, Porphyryon, the two sons of Alcides, Ephialtes, Ophius, Eurytus, Clytus, Ty- thybus, Pallas, Hippolitus, Agram, Thoas, and Typhon, the last of whom it was more difficult to vanquish than all the others. Jupiter having thus gained a complete victory, cast 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 Mol Etna and different islands.

For the explication of this table, some have supposed that Jupiter (for whose history, see JUPITER) destroyed the robbers that infested Thesaly, and that these are the pretended giants; for we have already observed (in the preceding article) that the appellation "Nephtian," 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 relied 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, so describe it. The banditti now mentioned, determined in their 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 piled Ossa upon Pelion, importing, as it is conjectured, that they had fortified these two mountains, which are also in Thesaly, and at no great distance from Olympus, whether they retired after their excursions, and kept Jupiter's garrison in awe. For other particulars, see Bailer'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 these, which have been publicly shewn 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 now 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 suppos'd 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 Phylloratus, 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 Tangier in Mauritania, mentioned by Plutarch and Strabo, and supposed to be the skeleton of Anteus; the skeleton of Pelas, 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. Aulins alleges, in proof of the existence of giants before the flood, a grider tooth, which he saw on the shores of Utica, which was in reality that of a
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The tooth in the church of St. Christopher, at Hirpilla, and the shoulder bone of St. Christopher, preserved in a church at Venice, are of the same kind. The tooth, preferred and shown at Antwerp, is only the grinner of an elephant; and another, belonging to a skeleton which was dug up near Tunis in 1635, was sent to the learned Pierref, who took the imprecision of it in wax, and comparing it with the tooth of an elephant shown near the place, found it to be of the same shape and size. Sir Hans Sloane has given an accurate and learned account of several other mistakes on this subject, for which we must refer to the Philof. Transact. N. 494. However, Montf. Le Curt, in a memoir read before the Academy of Sciences at Rouen, received a number of inferences, in which skeletons, or parts of skeletons, of an uncommon magnitude, have been found; these have been examined by anatomists, he says, and have been by them reputed real bones; and hence he infers the existence of giants.

GIANTS CAUSEWAYS, a name given in the county of Antrim, on the north coast of Ireland, to a vast quantity of that kind of basaltes, (see BASALTES) which stands in columns, and runs out a great way into the sea.

The ignorance of the vulgar as to the nature of this stone, has occasioned this great pile of it to be supposed artificial and the work of giants, since inhabitants there. But whoever considers this amazing series of columns, will be soon convinced no human hands could have formed them, and will find an accuracy in their figures greater than could have been expected from the most curious hand. The length of the several columns, and their joints so regularly placed in rows, and the niches of their articulations, by which no space or vacancy is left between, are wonderful.

This causeway forms a kind of mole, or quay, projecting from the base of a heap promontory some hundred feet into the sea; and the perpendicular columns of which it is formed exhibit an appearance not unlike a solid honey-comb. The angle columns are irregular prisms of from four to eight sides; but the pentagonal and hexagonal are by far the most numerous, and, when examined, they are found full half as much necessarily required in the places where they stand to fill up between others, so as to leave no vacancy. Each of these columns is separable into a series of joints, each of which is so well fitted to the place, that the joining appears only a crack or crevice in the flone: yet these are regularly articulated, there being always a convexity on one part, and a socket in the other to receive it, so that the joints cannot slip off from one another; besides which, the angles of one frequently shoot over those of the other, so that they are completely locked together, and can rarely be separated without a fracture of some of their parts. The depth of the concavity is generally about three or four inches. These hollows are of great use to the neighbouring poor, for they make a kind of salt pans of them, and thus very easily procure themselves a kind of bay-fall in summer. They fill these little basins with sea-water at high tides, and the heat of the sun and of the flone contributing greatly to the evaporation, as well as the shallowness of the basin, the whole humidity is found evaporated in the time of four tides, and they take out the salt ready for use. The length of these joints is various: they are from eight to four and twenty inches long, and for the most part longer towards the bottom of the column; they are generally from fifteen to twenty inches in diameter.

The triangular and square columns are fewer in number than the others, but they stand principally in the inner part of the large series, and are seldom seen, unless searched for by a curious eye.

The regular figure of the flone, composing this causeway, is not more wonderful than its quantity. The whole country for many miles being full of it, and a vast mass running far into the sea: for, besides what vulgarly goes by the name of the Giants Causeway, which is itself of vast extent, there are great numbers of the same pillars at distances in other places.

There are two other smaller and imperfect causeways to the left hand of the great one, and farther in the sea, a great number of rocks shew themselves at low water, which appear plainly all to consist of the same sort of columns. In going up the hill from the causeway there are found, in different places, a vast number of the same columns; but these do not stand erect, but are laid flantly upwards in different angles and directions. Beyond this hill, eafilward, also, at several distances, there stand a great number of the same pillars, placed slanting erect, and in clusters of different sizes. These are seen scattered, as it were, over the several parts of the hills.

One parcel of them is much admired, and called by the country people the looms of the organs. It stands in an elegant form, and faces the bottom of the hill. The columns, of which this cluster consists, are about fifty in number, and they are so nicely put together, that the tallest fland in the middle, and the shortest gradually on each side of it to the end, so that they look like the pipes of a church organ viewed from the front. The tallest one of all these, which stands exactly in the centre, is forty feet high, and consists of forty-four distinct joints.

What is eminently called the Giants Causeway is, in fact, a small portion of that vast basaltic area, of which the promontories of Bengalore and Fairhead confit, and which extends over a great part of the neighbouring country. These two great promontories, which have been examined by Hamilton and lately by Dr. Richardson, stand at the distance of eight miles from each other, and are the leading features of the whole coast of Antrim. The former of them, situated about seven miles Well of Ballycastle, represents itself at a distance, and in profile, as an extensive headland, running out from the coast a considerable length into the sea; but, strictly speaking, it is made up of a number of leffer capes and bays, the whole of which forms what the foremen denominate the headland of Bengalore. These capes are composed of a variety of different ranges of pillars and a great number of strata, which, from the abruptness of the coast, are very conspicuous, and form an unrivalled pile 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 raises its lofty summit more than 500 feet above the sea, forming the eastern terminations of Ballycastle bay. It pretends to view a vast 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 coarse texture. At the base of these gigantic columns lies a wild waste of natural ruins, of an enormous size, which, in the course of successive ages, have been tumbled down from their foundation by storms, or some more powerful operations of nature. The massive bodies have sometimes withstood the shock of their fall, and often lie in groups and clumps of pillars, resembling many of the varieties of artificial ruins, and forming a very novel and striking landscape. Besides these two promontories, there are several other parts of the county of Antrim which exhibit a similar columnar basaltic structure. Thus the mountain of Dunmull, between Coleraine and the river Buth, abounds in such basalt, particularly at the crags of Illamore, where two different ranges of columns may be discovered; they may be seen
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also at Dunluce-hill, near the castle of Dunluce; in the bed of the river Bush, near the bridge of Buff-mills; on the summit of the mountain of Croaghmore; in many parts of the high land over Ballintoy; in the island of Raggery, 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 dilant parts of the country, as far as the northern shore of Loughaneagh, and the mountains of the county of Derry; in many places of which imperfect columnar forms may be observed; so that the great cauze which generated this species of flow has been exerted 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 thofe 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 capes 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 delirious of joints altogether. 2. With respect to situation: the pillars of the Giants Caufeway fand on the level of the beach, from where they may be traced, through all degrees of elevation, to the summit of the highest grounds in the neighbourhood, as at the old fort of Dummull, and on the top of Croaghmore, fix hundred feet at leaft above the level of the sea. 3. With respect to diposition and arrangement: at the caufeway, and in most other places, they fand perpendicular to the horizon; in fome of the capes, and particularly near Uthet harbour in the ifle of Raggery, they lie in an oblique position; at Doon-point, in the fame ifland, 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 fuppofed from extreme fineneef to the coarfe granulated appearance of a flow, which refembles imperfect granite abounding in cryftals of fhorn, chiefly black, though fometimes of various colours. 5. With repect 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 rudeiy formed and cellular. The grofs pillars alfo, in the capes and mountains frequently abound in these air-holes through all their parts, which fometimes contain fine clay and other apparently foreign bodies: and the irregular basalt beginning where the pillars ceafe, or lying over them, is, in general, extremely honey-combed, containing in its cells cryftals of zeolite, little morfels of fine brown clay, fometimes very pure fteatite, and in a few infamces bits of agate.

The inland pillars, upon the whole, differ from thofe which run into the fcn, and are called the caufeway, only in the following particulars: fome of the inland pillars are much larger than thofe of the caufeway, being two feet and a half in diameter, and among thofe there are only found fuch as have three, four, five, and fix fides, none of them having yet been found to have five or eight fides, as many of thofe of the caufeway fcth have. And, finally these taller pillars, though compofed of as many joints as thofe of the caufeway, yet have not that curious articulation of the ball and focket, but are only joined by the laying one smooth surface on another; fo that a joint of a single column may be dropped off from the rem, by a confiderable force pressing against it. There is nothing like this observable fuch in fome of the columns of the caufeway itself: for among the numbers which are jointed by the ball and focket, there are fome which only adhere by being applied furface to surface. This is found only in a few of the columns, however, and they always fland within the clufiers, and are compofed of few thin fides. In thofe alfo the joint is not made by the application of two horizontal planes, but by fuch as flant, so that it looks very like the breaking of an entrochus or aferia.

The joints, as we fee the pillars above the furface, 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 fhortest at the upper part of the columns, and run gradually longer and longer as they approach the sea. This is obferved both in the inland columns, and in thofe of the caufeway; but though the length of the joints differs, their convexities and hollows are much the fame in all parts of the column.

There are other basaltic columns, similar to thofe above defcribed, in our own island; particularly at Staffa, one of the western iflands of Scotland; in the mountain of Cader-dris, 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 difcovered in the Venetian flate in Italy; one in Monte Roffo, about feven miles narrowly from Padua, and the other in Monte del Diano, near San Giovanni Allarme, about ten miles north-west of Vicenza. The form of the latter is nearly circular, refeembling 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 fame size, and mafter about a foot in diameter; thofe of Monte Roffo are very unequal, some being a few inches, while others scarcely exceed three inches in diameter; thofe of both thefe Venetian groups manifest all the varieties of prismatic forms obfervable in the Giants' Caufeway, and other fuch groups; but they are commonly of five, fix, or seven fides, and the hexagonal form seems mostly to prevail.

The texture of the former ftrict is folid and uniform; the furface smooth, and the internal parts of a dark iron-grey colour; thofe of Monte Roffo have a rough and knotty furface; and, when broken, manifest a variegated colour, and unequal texture of parts; refeembling an inferior ftrict of granite, of which the mountain is formed, and which ferves as a bafe for this range of columns. Other groups of artifiicial basaltic columns have alfo been obferved in the province of Velay and Auvergne in France; particularly by M. De Varennes, at Blaud near Langens, and M. Dalmart, near le Mont d'Or; and M. Sage mentions another near St. Alcon, in the fame province. Kircher has long ago defcribed a group of the fame columns near Viterbo in Italy. Mundus Subterr., lib. viii. cap. 9, &c. And Mr. Strange mentions another at Caffel 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 meta-tray-ruccs in general, see Trufp.

GIANTS' HEAD, in Geography. a cape on the eait coaft.
of the island of St. Christopher, a little to the east of Ragged Point.

GIAR, a town of Peria, in the province of Farilban; 70 miles E. of Schiras.

GIAR, Al. See Djar.

GIAR Anahar, in Botany, a name given by Avicenna, Scarpian, and the rest of the Arabian writers, to the potamo-phon of those times. This is translated from the water-rush, but that is founded on an error: it is certain that the plant thus called by the Arabians was very different from the potamo-phon of our times. Avicenna tells us, it had flowers resembling those of the water-lily; and it seems either to have been the ignota aquatica 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. 12°.

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 choi-rifer in the Duomo at Milan, under Palesini, of whom he learned figuration, the harpsichord, and composition; but having personally manifested a disposition and partiality for the violin, his father recalled him to Turin, in order to receive instructions on that instrument of the famous Sonini. But though his preference of 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 practise that instrument; but he used to say, that he was perforce cured of that vanity at Paris, by the performance of Madame de S. Maur, a helicar 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 instru-ment again in serious practice. He went to Rome early in his life, and afterwards to Naples, where, having obtained a place among ripienos in the opera 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 composed it, came into the orchestra, and lecting himself close by me, I determined to give the maestro di cappella a touch of my taste and exaction; and in the symphony of the next song, which was in a pathetic style, I gave loose to my fingers and fancy; for which I was rewarded by the composer with a violent slap in the face; which," adds Giardini, "was the first time 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 at a benefit concert for old Cuzzoni, who sung in it with a thin cracked voice, which almost frightened out of the little theatre in the Hay-market the fan of those who had perhaps heard her at the great theatre in the same street, with extasy. But when Giardini played a solo and concertos, though there was very little company, the applause was loud, long, and furious, as nothing but that bestowed on Garrick had ever equalled. We had met him the night before at a private concert, with Gardiner and Trifi, at the house of Nothrab. Franks, esq., who was himself one of the last dilettanti performers on the violin in that time; and we were all equally surprised and delighted with the various powers of Giardini at so early a period of his life; when, besides, it is 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 practised any thing else. His tone; bow; execution; graceful carriage of himself and his instrument; 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 moment's of conception; and lastly, playing variations extempore, during half an hour, upon a new but extra-ordinary 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 Feodric, Brown, and Collet! By the academy, scholars, manner of leading the opera and oratorio; performance in private concerts, compositions vocal and instrumental, we shall lay nothing here, lest our praise should be too much for others, and too little for ourselves.

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 musicians; at the Castle and King's-Arms concert in the city; and in 1754, he was placed at the head of the opera band; in which he introduced a new discipline, and a new style of playing, much superior in itself, and more con-genial with the poetry and music of Italy, than the languid manner of his predecessor Feodric; who, except one or two seasons, when Veracini was at the head of the orchestra, had led the opera band from the time that Caffraniu was diffi-ciliated, till the arrival of Mingotti.

In 1756, on the failure and flight of the Imperatorio or undertaker of the opera, Vanefchi, the Mingotti, 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 applause was acquired, and appearances were favourable, yet the profits to the managers were so far from solid, that they found themselves involved at the end of the season in such difficulties, that they were glad to resign their slippery honours, and thrink into a private station.

Giardini, while in the opera management, besides arranging paticioses, set several entire dramas; but though he had so great a hand on his instrument, so much fancy in his compositions, and so liberal a flank for the audience, 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 lively air or romance into the operas of other masters, which was more applauded than all the rest of the drama; of which kind were the favourite airs of "Voci amanti," and "Ah non fi perde tu fiii," &c.

In 1762, on Mattei quitting the management of the opera, in spite of former unfriendliness, Giardini and Mingotti again regained the reins of opera government. But after struggling two years against the storm, during the decline of Mingotti'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 hovering over his former Lyric kingdom, without the power of invading it, or bringing about a resperation, was forced to content himself with teaching ladies of rank and fashion to sing, and the produce of a great annual benefit. He continued here, unrivalled, as a leader, a solo player, and a composer for his instrument, still augmenting the importance of his instrument and our national partidity for the tale of his country, till the admirable productions and great performers of Germany began.
began 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 legions.

At the end of 1784, he went to Italy, and resided 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 1789, 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 dropical, 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 1793, he went to Petersburg with his burletta troop; which seems to have pleased as little there as at Moscow, 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 at superiority over all mankind, past, present, and to come. Homer, our own Shakespeare, and Milton, have, perhaps, succeeded in that with, if ever they formed it, and Dryden and Pope have gained two out of three of these ages. If Giardini has been surpassed by a few in taste, expression, and execution, his tone and graceful manner of playing are still unrivalled, nor does any one, of all the admirable and great performers on the violin, surpass all others so much at present, 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 same 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 fiercely 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 deviate 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 existence in misery and mortification.

A respectable professor, who, from Giardini’s first arrival in England, was constantly attached to him, and a sincere admirer of his talents, his wit, and even the immensity of his spleen and spite; before he quitted 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 facility and cunning, than be gashed by usual and fair means; who is so difficult a commerce, that the utmost circum-
and distinguished by its agreeable situation and fabulous air; 15 miles W. of Turin.

GIAUF, Aa, 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 Algheri.

GIAUKIRI, a town of Asiatic Turkey, in Natolia, anciently "Sigeum," chiefly inhabited by Greeks.

GIAZA, a town of Italy, in the Veroné; 14 miles N.N.E. of Verona.

GIB, in Agriculture, a sort of stick with a hook at the end, which is sometimes useful in making and repairing hedges, and for various other purposes.

Gib, in Mechanic. See Crane.

Gibbs, or Tidings. In Minerva, 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 slats 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 Gibraltar.

GIBBEN, a town of the duchy of Courland; 32 miles N.E. of Piltyn.

GIBBETHON, in Scripture Geography, a city of Dan, allotted to the Levites (Josh. xxi. 23.); probably the same as Gubbata; 12 miles from Eleutheropolis. Here they shared 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, informed that his parents had but little hope of rearing him. From nine years of age to twelve, he was under the tuition of Dr. Woodfon at Kingston-upon-Thames. Here he acquired the elements of classical learning, and he mentions his twelfth year as particularly "propitious to the growth of his intellectual faculties," because at this period he read a variety of English works of poetry, romance, history and travels.

He then went to Weitsmantle 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 overfed by the arguments of the former, and in 1755 he had an interview with a popish priest in London, when he solemnly abjured 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 blith if my tender mind was entangled in the sophistry that seduced and many misunderstandings 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 found 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 him 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 wanted no 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 "L'éloge fur 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 last 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 commision which he had held in the militia, and he immediately paid a visit to Paris, and during some months in that capital, he went to Lausanne, where he passed 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 fat amusing amid the ruins of the capital, while the fairs were singing vespers in the temple of Jupiter, that the idea of writing his great work, viz. "The History of the Decline and Fall of this City," rushed into his mind. He had, previously to this, proceeded some way in another intereting 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 allided in compiling a critical work, entitled "Mémoires Littéraires de la Grande Bretagne," the successe of which was but trifling. In 1770 he published, in his native tongue, a pamphlet, entitled "Critical Observations on the sixth book of the Aeneid," which was intended as a refutation of Dr. Warburton's hypothesis concerning the meaning of the defeat of Æneas; and in the same year, by the death of his father, he succeed to an estate considerably involved, and from the perplexities of which he scarcely ever extricated himself. His circumstances were, however, well suited to the talk 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. Leisure and books were necessary on
the one hand; on the other, the stimulus of a handsome 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 sanguine expectations of the author: "The first impression," says he, "was exhausted in a few days; a second and a third edition were fearfully adequate to the demand, and the book-seller's property was twice invaded by the pirates of Dublin." It was received with general applause, but the praises of none were so keenly relished by Gibbon, as those 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 triumphs, his two chapters, concerning the growth and progress of Christianity, raised a storm against him, which, as he had 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 instance his fidelity, as an historian, was attacked; here he felt that he was called on for a "Vindication," in which he admitted that he successfully repelled the principal charges, and returned them on his antagonist. It was suggested, in the two chapters referred to, that the progress of Christianity was peculiarly favoured by secondary causes, and, of course that its origin was not divine; though this theory had not been delineate of advocates among sincere believers in the truth of the Christian syllem, yet there is little doubt that Gibbon was an unbeliever, and he wrote 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 resumed his work, he was solicited by ministers to write an answer to the manifeste of the court of France, on its declaration of hostilities. On this occasion he published his "Memoire Justificatif," which 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 Lausanne: 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 diminished an occupation, which had given to many years of his life that zeal which an interesting object of pursuit can alone impart. He came to England to superintend the printing of his work, and then returned to Lausanne, to spend, as he hoped, the remainder of his days; but the horrors of the French revolution, which menaced the quiet and happy regions of Switzerland, gradually loosened his attachment to Lausanne, 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, or had become so from the occurrences of the times, a decided enemy to every species of public reform. He avowed his assent to Mr. Burke's creed, which he had vindicated in his "Reflections:" "I admit," 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 1792, but after a few months residence his attention was forcibly called to the progress of a disease, which had subsisted 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 repose 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 elegances of cultured life effectual to his comfort, and he was not one, who could have been content with the consolefiances of mental superiority in an humble state. His great work, which will long be a monument to his fame, is a performance of vail 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 blemished 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 Music, organist of Brifol, 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 1604, 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 countenanced 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 his 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 green-sentiment, as well as boys, through idleness 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.

The harmony in Gibbons's service in P, printed by Dr. Boyce, is pure, clear, and grateful; and the melody more accented and flowing than we have found in any choral music of equal antiquity.

The two parts in one, of the Gloria Patri, though they may be the cause of some confusion in the words, discover no restraint or trifling in the melody, which continues to move with the same freedom, as if no composer had exultation. And though the parts, on account of the confusion arising from all the parts singing different words at the same time, pronounced in 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, alla Palestrina, a style in which Tallis and Bird acquired so much renown.

Besides his admirable choral 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 Parthemia.

Dr. Tudway, 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 exalted 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 to solemn, the fugues and other embellishments so just and naturally taken, as must warm the heart of any one, who is endowed 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 not 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 1625, being commanded, ex officio, to attend the solemnity of the marriage of his royal master, Charles I. with the princess Henrietta of France, at Canterbury, for which occasion he had composed the music, he was seized with the small-pox, and dying on Whitunday, 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 honored with the notice of Charles I. and was of his chapel. At the reformation, besides being appointed principal organist of the Chapel Royal, private organist to his majesty, and organist of Westminster 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 Ant. Wood in the Pall Oxon, 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 man, 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 honours 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 Brilrot, and the other of Salisbury. Edward was a Cambridge bachelor of music, and incorporated at Oxford, 1592. Besides being organist of Brilrot, he was priest-over, sub-choirer, and master of the choir-boys in that cathedral. He was sworn a gentleman of the chapel, March 21, 1663, and was the master of Matthew Lock. In the Triumphs of Oriana, there are two madrigals, the 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 rebellion he assisted king Charles I. with the sum of one thousand pounds; for which in token of his loyalty, he was afterwards very severely treated by those in power, who deprived him of a considerate estate, and thrust him and three grand children out of his house, though he was more than four score years of age.


GIBBOUS, in Astronomy, is used in reference to the enlightened parts of the moon, while the is moving from full to the first quarter, and from the left quarter to full again; for all that time the dark part appears horned, or eulogised, and the light one bunched out, convex, or gibbosus.

GIBBOSIUS fil. ghibbianus p. t. in Ichthyology, a name given by Mr. Ray to the fish called by the Dutch brui. 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 rind of its back, which is like that of the perch, but much thicker. Ray's ichthyolog. 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. 126° 5'.

GIBE, a town of Arabia, in the province of Nodin; 130 miles E. N. E. of Hajar.

GIBEAH, in Scripture Geography, a city of Benjamin, the birth-place of Saul, the first king of Israel. Josh. xiii. 24. Ezra ii. 26. Nehem. vii. 36. Gibeah was about two leagues N. from Jericho. In Jerome's time it was entirely destroyed.

GIBEL-EL-TOR, a mountain of Palestine, anciently called Mount Tabor, which see.

GIBELLET, or GARBLE, a sea-port of Syria, anciently called "Gabala" and "Gabulon." Situated on the coast of the Mediterranean, at the mouth of the river Jabbok; 12 miles S. S. W. of Tripoli.

GIBELIN, a town of Palestine; eight miles E. of Gaza.

GIBELINS, Gibelins, Gibellins, or Gibellines, a famous faction in Italy, opposite to another called the Guelphs.

The Guelphs and Gibellins 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 conflicts and mortal wars.

The Guelphs frequently offered the power of the see of Rome, as the Gibellins did the emperor's right of fore-
GIBELINO, 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, which awaited themselves of the oaths of Joshua, and of the elders of Israel, in an artful representation which they made of their belonging to a remote country. (Josh. ix.) Joshua and the elders made an unadvised league with them; but upon a discovery of their mistake, they spared their lives, and condemned them to the servile office of carrying wood and water to the tabernacle, and other work of a similar kind, in token of their puerility and duplicity, as slaves and captives. In this state 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 poissed four cities, viz. Cepherah, Beeroth, Kirjath-jearim, and Gideon, the capital, afterwards given to Benjamin, excepting Kirjath-jearim, which was assigned to Judah. The Gibeonites submitted to the burdens imposed upon them by Joshua, and continued faithful to the Ishmaelites. Nevertheless Saul destroyed a very great number of them (2 Sam. xxi. 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. 2582; B. C. 1017); 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 unrelented. 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 cursed them in the beginning of spring, when, in Paelin, 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 "Ne-Thinim," who were public slaves appointed for the service of the temple. (1 Chron. ix. 2.)

Gideon was seated on an eminence, as appears by its name, denoting a hill; it was 40 furlongs N. from Jericho, according to Josephus. It is called "Gaba'a" (see 2 Sam. v. 25, compared with 1 Chron. xiv. 16.) We find mention of the fountain and pool of Gideon. (2 Sam. ii. 13.) The tabernacle and altar of burnt offerings, made by Moses in the wilderness, were removed to Gideon. (1 Chron. xxv. 29, 30.) When Solomon was seated on the throne, he went to sacrifice at Gideon, 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, BALDIANUS, in Biographia, was born at six in 1062. 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 Beauvais, and in 1688 he
obtained the professorship of rhetoric in the college of Mazarin 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 chosen rector. 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 bull Unigenitus, the court, in 1740, exiled him to Auvergne. 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 véritable Eloquence," "Réflexions sur la Rhetorique;" "Judgement iitriles Geography," "Histoire des Savans sur les Auteurs qui ont traité de la Rhetorique," in three volumes 12mo. Moretti.

GIBERTI, Giambattista, a very learned prelate of the church of Rome, was born at Palermo 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. He was introduced to pope Leo X. who entertained a great regard for him. He had a thirst 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, however, allowed to take possession of his fee, 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 interposition of his friend, Cardinal Pompeo Colonna, restored to his liberty, and retired to his bishopprie, on which he continued 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 collectively; they chiefly consist of his constitutions and regulations for the government of his church, which under his direction 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 resorted to his palace, among whom was the celebrated poet Flaminio. He printed at his own expense, and under his own superintendence, several works of the fathers, and in order to render his editions correct, he entertained several Greek copyists. Moretti.

GIBET, or Gibet, a machine in manner of a gallows where notorious criminals, after execution, are hung in irons, or chains: as spectacles, in terrærem.

The word in French, gibet, properly denotes what we call gallows: it is suppos'd to come originally from the Arabic gabet, mount, 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 suppos'd to be formed of goble, from the French gobeau, mouthful.

Giblets make a considerable article in cookery: they boil giblets, fry giblets, make ragouts of giblets, giblet-pies, &c.

GIBLIEN, in Geography, a town of Egypt, on the left bank of the Nile; 13 miles N. of Afn.

GIBLOS, a city on the coast of Phœnicia, between Tripoli and Beræta; called also Byblus, which fee.

GIBON, a town of the island of Cuba; 22 miles N.N.E. of Bayamo.

GIBRÁLTER, a town of Spain, in the province of Seville, on the river Odicel, with a harbour for small fishing vessels; containing about 150 houes in two parishes, and situated about 10 miles from the Atlantic; 44 miles W. of Seville. N. lat. 37° 20'. W. long. 7° 1'.

GIBRALTAR, derived from Gibel, an arabic word signifying mountain, and Tarle, the name of a Moorish general, 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 southern 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 and the Mediterranean, called in Latin "Fretum Herculanum, or Gadjtanum," and in English the Strait of Gibraltar. The length is about eight leagues, and the breadth, in the narrowest parts, nearly five. On these two promontories 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 seas, and five kingdoms, viz. Seville and Granada, in Spain, and Barbary, Fez, and Morecco, in Africa. In endeavouring to trace the town mentioned by Melas, Strabo, and Phinius, under the names of Calpe, Carthaya, Melaria, Belo, and Belipo, and also the promontory of Juno, situated from east to west on the shore of the straits, no vellige is perceived, except the mountain and seite of Carthaya; which latter city passed from the possession of the Phœcicians to that of the Carthaginians, and is now reduced to a mere heap of ruins, scarcely discernible in the bay of Gibraltar, where the Carthaginian tower was also situated. This ground is now occupied by a meadow farm. On calling your eyes over the kingdoms of Granada and Seville, you see the lofty ridges of the defert del Cuerro, as well as the mountains of Hogen and Sanorin, and towards the east, opposite to Gibraltar, the new town of Algiers. In the middle of this immense expanse of waters the ruins of Great Carthaya; at a short distance, on a little hill, the town of St. Roch is situated; on the east you perceive the chain of mountains, called the Sierra de Ronda, abounding in fruits and aromatic plants. Near these is said to be the town of Munda, so celebrated in Roman history as the scene of the battle between the forces 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 Nevada, and the Alpajuras; on which the snow lies all the year. The mountains supply a number of fountains and rivulets of clear water, forming the fountains of the Xenil 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 isthmus, or neck of land, so narrow, that from some aspects the rock has the appearance of an island. The length of the isthmus is about 200 paces; across which the Spaniards have drawn a line and fortified it, to prevent the garrion 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 1/2 of a mile. The line of its ridge is undulated, and the two extremes are somewhat higher than the centre. The summit of the Sugar-loaf, which is the highest point towards the south, is elevated
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 slopes, 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 iikums, and is entirely covered with fortification. The eastern side of the mountain mostly consists of a range of precipices; but a bank of sand, rising from the Mediterranean in a rapid acclivity, 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 masts 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. These beds, 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 masts of this rock, we find tesselated 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 flow, but constant deposition; and the uncovered parts of its 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 reappears upon a rock of an argillaceous nature. This last bed, which is 17 inches thick, consists of quartz 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 fretted 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 side nearest Spain, the internal fortifications, made since the time Gibraltar was besieged by the combined armies of France and Spain, are astonishing. 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 excavation was effected by the force of gunpowder, 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 mountains 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 437 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 caprices of nature similar to those of the former, but so regularly disposed, that it has the appearance of a temple. Perhaps this was formerly used for consulting some oracle, probably that of Hercules, who was the principal divinity of the place, as well as of the cave in the promontory of Ampelus, 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 fort. 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 meadows 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 5000 feet above the level of the sea, you discover the magazines, the batteries, the new town; on 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 them are eight magnificent ciphers, large enough to contain 50,000 tons of water, and bomb-proof; they receive all the water which flows down the side of the mountain, previously purified in copper vessels erected for the purpose. On the south side you perceive a number of mountains, called Tarfes; and near them formerly stood a very ancient tower, with a cistern and well. In a cove not far distant several flutes have been found with human bones above the common size, to strongly incut them as to form one solid mass. (See Pollard's Regnums.) From Europa Point to the gate on the land-side
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 comprising the garrison, can perform their manoeuvres without inconvenience. Here the guard always mutters, 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 shaky 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, 300 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 breast-works, thrown up in 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; consisting chiefly 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 numerous bow windows, behind which the prime goods of all ports are exposed to sale. The inhabitants are chiefly military; the commerce with Africa is neither constant 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 Borda) to indemnify England for a million and a half of plate, which on an average it sells 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 fleets of war. The port is a key to the Mediterranean and to the Atlantic; confus from all the isles of Europe and North America usually reside 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 flour, cod, pitch, and tar, masts, rum, maize, rice, flour, sugar, pepper, ginger, cotton, aniseed, and the other articles of commerce, which they procure from Abyssinia, Africa, and Europe. The coasts 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, figs, salt, &c., which the merchants 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, showing 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 very violent. The police is well conducted; no beggars are to be found here; the streets are preferred clean and plentiful; and though they are all well lighted at night, no one is allowed to walk without a lantern, and a permission from the general of 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 tape. 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 replying.

The origin and foundation of this town are lost in the obscurity of time. It is certain, however, that the Phenicians, 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 preserved among the Phenicians, who peopled 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 not 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 than 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 1316, it was taken from them by Perez de Guzman; but they took it in the year 1333, 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 Rooke, 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 immortal honour of the brave defenders: 16 miles N. of Ceuta; 76 S. of Seville. N. lat. 36° 44'. W. long. 5° 19' 46'.

Gibraltar, an ancient town of South America, in the government of Caracara, and province of Venezuela, is situated on the E. coast of the lake Maracaibo. The country in its vicinity is well watered with rivers, and furnishes all kinds of the most quality, and very large-reeds. The bell Spanish tobacco is produced here, called Tobago de Maracaibo, from which is made the valuable snuff, vulgarly called "Meekeba" snuff. The air is very innoxious 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. 10° 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 Memphia-
magog, 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 Welford-more, in the year 1666. 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 Polyceni-Mudiana, and James V. of Scotland’s Catinica Rubfica, quartos, illustrated with notes. In 1692, he gave a translation in the Latin language, together with the original, of the “Chronicon Saxonicum”; likewise a work entitled “Liberum Manuscriptorum in duabus insignibus Bibliothecis, altera Dugaldiana Osnoni, Catalogus,” with a dedication to Dr. Temnion, 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. Gibbon 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 “Cæsem’s Britannia.” This work was patronized by lord Somers, who offered Mr. Gibbon 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. Temnion, who received him into his family, and who appointed him morning preacher at Lambeth church. His publications about this period were, “Vita Thomæ Bodleii, Equitis Aurati,” together with “Hitoria Bibliothecæ Bodliæanae;” also, “Reliquiae Spelmannianæ;” 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 interest he obtained the lecturership of St. Martin’s in the Fields, and was presented to the rectory of Stitled in Essex. His promotion in the church went on rapidly, but it did not render him indifferent to the cause of literature, and in 1713 he published his celebrated work, entitled “Codex Juris Ecclesiastici Anglicae; or the statutes, constitution, canons, rubrics, and articles of the church of England, methodically digested under their proper Heads, &c.” The scheme of church power vindicated in this volume was excepted against, not only by dissenters, but by the founders and most constitutional 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 sacerdotal empire, which must draw all power to itself, and render the civil magistrate 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 Lon-
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, kindled him in the effusion of the prime minister, sir 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 constitutions 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 Bristol, afterwards Mr. Justice Foller, at the desire of lord Hardwick, lord-justice of the court of king’s bench. Bishop Gibbon’s constitution was naturally strong and vigorous, but he exercised it with almost incomparably, to that, at length, it might be said to be fairly worn out by his labours 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-third 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 inanity and enthusiasm; some vitiation 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 polished the social principles in an eminent degree, and his beneficence 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 2500l. which bishop Gibbon freely gave to Dr. Crow’s own relations, who were in indigent circumstances. Biog. Brit.

GID, or GIDDY, in Rural Economy, a morbid condition occurring in sheep and some other animals, in which there is a confluent 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 side 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 fluidy evil, the cure being attempted by the use of small bleeding and affaetides; and in order to guard against a relapse, the sheep should be put into a hilly or elevated pasturage.

Among the graziers in the county of Lincoln the disease is known by the terms fluidy, and bladder on the brains, and in its remedy a fort of trepanning proceds is had recourse to, by which great numbers of sheep are supposed to be saved. The person who performs the operation raises the scalp with a strong hooked knife jut 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 by a hinge on one side; then by means of a quill, cut flaring to a point, in the form of a spear, and hacked on each side, the bladder is sought for and brought out whole, the
bone being immediately put down again, and covered with a platter.

The South Down sheep farmers, when the animals are affected in this way, say they are *paterfis*.

Various other modes of cure have been proposed, but they do not seem worthy of much attention. See *Sheep*.

*Gidda*, in *Ancient Geography*, See *India*.


*Giddiness*, in *Medicine*, a sensation as if the objects surrounding the person were in a state of circumjacent, or whirling motion, accompanied with an inability to maintain the erect posture, or to move forward in a straight line; in technical language this is designated *Vertigo*; which see.

*Gidrno*, in *Geography*, a town of Albania; 8 miles N. of Alessio.

*Gida*, a river of Sweden, which rises in the Lappmark of Åsele, and traversing Angermanland, runs into the gulf of Bothnia. N. lat. 16° 20', E. long. 18° 54'.

*Gidel*, a town of Candahar; 50 miles S.E. of Kabul.

*Gidid*, a town of Africa, in Dar-fur, nearly S.E. and about 22 miles from Cobbi, on the road from Cobbi to Kil. This town has a competent supply of water; and yet the Fukkara, who poiffs it, are supposed to be so destitute of hospitality, that they will hardly furnish a traveller sufficient to allay his thirst. In this town are many huts, and some of them belong to merchants who derive their origin from the eastward. — *Alfo*, a town of Nubia; 35 miles S. of Gerri.

*Gid,-shehir*, a town of Asiatic Turkey, in Nato- lia; 8 miles S. of Biebehiri.

*Gidola*, a town of Russia, in the government of Wil- burg; 20 miles N. of Wilburg.

*Gieg*, a town of Germany, in the bishopric of Bamberg; 7 miles N. of Bamberg.

*Giedkuliszi*, a town of Samogitia; 24 miles S. of Rorene.

*Giedroyce*, a town of Lithuania, in the palatinate of Wilna; 24 miles N.W. of Wilna.

*Giedungen*, a town of Norway, in the diocese of Christiania; 18 miles N.W. of Stavanger.

*Gieguzin*, a town of Lithuania; 15 miles S. of Wilkomiers.

*Gie.*, in *Botany*, the Ceylon name of a small fruit, described by *Gartner* v. 2. 486. t. 180, of which nothing more is known. The nucleus is singularly pitted, like a *Rutus*, but if the figure be in all points correct, it cannot be a grain of the fruit of that genus. The internal parts, being decayed, might have afforded something decisive, especially the situation of the embryo.

*Gillum*, in *Geography*, a town of Norway, in the diocese of Aggerhus; 53 miles N. of Christiania.

*Gien*, a town of France, and principal place of a dis- trict, in the department of the Loire, seated on the Loire; 32 miles S.E. of Orleans. The place contains 5117, and the canton 11,366 inhabitants, on a territory of 410 kilomet- res, in 11 communes. N. lat. 49° 45'. E. long. 0° 13'.

*Giene*. See *Ken*. A

*Giersor*, a town of Africa; 10 miles S. of Tripoli.

*Gier*, a river of France, which runs into the Rhone, 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. 12° 35'. — *Alfo*, a town of Sicily, in the valley of Demes- na; 30 miles S.W. of Milletta. N. lat. 37° 48'. E. long. 14° 22'.

*Gieranonly*, 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 Doee.

*Giesim*, a town of Nubia, between Senmaar and Abyssinia; 100 miles E.S.E. of Senmaar. N. lat. 13° 16'. E. long. 35° 15'.

*Giessen*, a strong town of Germany, in the princi- pality 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 Mentz. N. lat. 50° 35'. E. long. 8° 43'.

*Giezina*, a town of Samogitia; 22 miles E.S.E. of Roe- fienne.

*Giffa*, a town in *Surger*, signifying dwellings behind the ears.

*Giffen*, Herbert, in *Biography*, a lawyer and philo- logist, was a native of Gueldres in France. He studied at various universities, as those at Louvain, Paris, and Or- lens, and in 1567, he took his degrees in the law. He went to Venice in the train of the French ambassadour, and from thence to Germany, and taught philosophy and juris- prudence at Strauburg, Altdorf, and Ingolstadt. He was educated in the principles of Protestantism, which he renounced for the Catholic religion previously to his being in- vited to the imperial court, where the emperor Rodolph be- folowed 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 Imp. Juliano*;" "*Index Hlitt. Rerum Romanorum*"; and notes and comments upon Aristotle's politics, ethics; also upon Lucertins, Moror, Baylo. *Giffth-Meleh*, the name given by the German chen- mists and metallurgists to the first appearance of arsenic, or the grey flowers arising from the roasting of cobalt, and flicking to the long wooden funnel, which they carry from the furnaces. The word giffth-mehl is German, and signifies poisonous meal or flour.

*Gifhorn*, in *Geography*, a town of Germany, in the principality of Luneburg-Zell, seated on the Allier; 19 miles E. of Zell.

*Gifoni*, a town of Naples, in Principato Citera; 7 miles E. N. E. of Salerno.

*Gift*, or *Grant*, in *Law*, a method of transferring personal property, answering in some measure to the convey- ances of real estates. Gifts and grants are thus to be dis- guised 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 *personam*. Under the former class 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 bestowed; being usually expressed to be made in consideration of blood, or natural attachment, or of five or ten shillings nominally paid to the grantor; and in case of leases, always reserving a rent, though it be but a peppercorn: any of which considerations will, in the eye of the law, convert the gift, if executed, into a grant; if not executed, into a contract.
Grants or gifts of chattels personal are the act of transferring the right and possession of them; whereby one man renounces, and another man immediately acquires, all titles 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, is 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 otherwise pernons 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. 100l. or a flock of sheep, and puts him in possession of them directly; it is then a gift executed in the donee; and it is not in the donor's power to retract it, though he did it without any consideration or recompense (Jenk. 109): unless it be prejudicial to creditors; or the donor were under any legal incapacity, as infancy, coverture, durefs, or the like; or if he were drawn in, circumvented, or imposed upon by false pretences, obesity, or surprize. But if the gift does not take effect, by delivery of immediate possession, it is then not properly a 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 feoffment is to an estate in fee, and lease to that of an estate for life or years. It differs in nothing from a feoffment, but in the nature of the estate passing by it; for the operative words of conveyance in this case are do or dedit (Weit. Symbol. 256); and gifts in tail are equally imperfect without delivery of seisin, as feoffments in fee-simple. (Litt. § 50). See Feoffment. This is the only distinction which Littleton seems to make, when he says (§ 57), "it is to be understood, that there is seffor and feoffor, donor and donee, lessor and lesee;" viz., feoffor is applied to a seffor in fee-simple, donor to a gift in tail, and lessor to a lease for life, or for years, or at will. In common acceptance gifts are frequently confounded with grants. (See Grant.) Blackl. 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 Year's. See STRENE.

GIG, Fish. See Fish-gig.

GIGA, ItaL. GIGUE. Fr. a jig, the name of a gay dance, and of its tune. The Crufa Dict. defines this word from Dante, par. 14, "fiumeno mosfale di corvo"; a musical instrument with strings. The Crufa, likewise, says, that it is an intrumental movement, to called.—Walther's derivation from Stige, 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 3, 5, or 7.

Carelli's jigs were long in favour; but, being in the fashion, as most of our old country-dances, they are almost all become vulgar, except the gighe in his 5th folio, and 15th sonatas, op. 11.

Rouleau says that jigs 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 3, 5, or 12 quavers in a bar, is still a gighe, or jig.

GIGAIA, GIGHA, GIG, or GIGA, in Geography, one of the smaller western islands of Scotland, about 7 miles long and one breadth, partly rocky and partly arable, situated in N. lat. 55° 56'. W. long. 5° 43'. and separated from the peninsula of Cantyre, or Kintyre, by a channel 3½ miles broad. There are no trees in this island; but oaks are sometimes dug up in the morasses. Near its centre is Dun-cliffs, 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 some remarkable caves; and on the S. coast is a subterraneous passage 133 feet in length. Between the projecting points and rocky rocks on the E. coast are creeks, in which vessels may be safely moored. This island contains 592 inhabitants.

About 1½ miles S. from Gigha, is the isle of 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 land is a mixture of fields, sand, and common mould; the rest of the island, the surface, is a stratum of peat earth. Between Gigha and Cara is Gighalum, a small uninhabited island.

GIGANTES, a cluster of small islands among the Philippines, N. W. of Sibu. N. lat. 11° 42'. E. long. 121° 20'.

GIGANTIC. See GIANT.

Gigantic Order, in Architecture, 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 γίγαντης, (gigante, giant; and μάχη, combat, of μάχομαι, μάχη, I 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 asilence which she gave to Jupiter in his content with the giants.

Gigay, in Geography, a small island of the Hebrides, on the E. coast of Barra, yielding tolerable pasture, but difficult of access.

Gigeri, See JIEL.

Gigeri, 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 Giga.

Giges, 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.

Gige, 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-
flan college at Milan. He was author of many learned works, but that on which his reputation is chiefly established, was entitled "Theaetetus Linguae Arabeæ, seu Lexicon Arabico-Latinum," published in four volumes folio, in 1632. As a resource 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 Algilia, or Iglion. N. lat. 42° 28'. E. long. 10° 53'.

GIGMILLS, a kind of fulling mills, for fulling and burling of woollen cloth, prohibited, anno 5 and 6 Ed. VI. c. 22.

GIGNEE, in Geography, a town of France, in the department of the Herault, and chief place of a canton, in the district of Lodève, seated on the Herault; 10 miles S. E. of Lodève. The place contains 2785 inhabitants, and the canton 13,632 inhabitants, on a territory of 290 kilometres, in 21 commune. N. lat. 43° 39'. E. long. 3° 38'.

GIGNY, a town of France, in the department of the Yonne, on the Surin; 7 miles S. W. of Orgelet.

GIGOT. See Gioia.

GIGOT, in the Munage, a branch after the form of a gigot, or leg, is a branch, the lower part of which is round, and called in French gargouille.

GIL, in Geography. See Jhox and Anu.

GILJON, in Scripture Geography, a fountain, well of Je-rufalem, where Solomon was anointed king by Zadok and Nathan. The upper channel of Gilon was ordered, by Horeckia, to be conveyed into Jerufalem, for the advantage of the waters; 1 Kings, i. 55. 2 Chron. xxviii. 30. - Alto, the name of one of the four rivers, whose sources were in Paradise, Gen. ii. 13. The Arabsians believed this to be the Ouxus, a river which rifes in the mountains of Imaus, and runs from east to west; and after winding much, returns, and discharges itself into the Caffian sea, westward. This river separates the provinces of the Turks and Persians. Modern geographers call the Ouxus, Anu; which see. The Arabians name it Gehon, and Neher-Bakh, the river of Balk, because it passes through that city. Calvin, Scaliger, and others, think that Gilon is the most western channel of the two made by the Tigris and Euphrates, when, after their confluence, they separate again to enter the sea. Others again maintain that Pifon is the western channel, and that Gilton is the eastern. This is the opinion of Dobo- chart and Huetius. (See Eden.) Others suppose the Gilton to be the Araxes which see.

GILON, Juxta of the Romans, a considerable sea-port town of Spain, in Alturias, formerly the capital of this province, with an old castle, containing about 800 families, 18 miles N. of Oviedo. This infertile port, contracted and maintained at a great expense, is referred to by the English for shanters and cachifts. N. lat. 43° 32'. W. long. 5° 42'.

GIKRI, a town of Hindoofland, in the circur of Nagore; 15 miles S. E. of Catchwe.

GIL, Island of, an island of the North Pacific ocean, so called by lignor Caamano, about 14 miles long and 6 broad, between Princes Royal’s island and Pitt’s Archipelago.

GILA, a river of New Mexico. See Colorado.

GILACAN, a small island in the North Pacific ocean, N. of the Catanduanes. N. lat. 14° 26'. E. long. 124° 27'.

GILARZA, a town of the island of Sardonia; 15 miles S. E. of Doha.

GILATTELKE, a town of Transylvania, 14 miles N. of Chuenenburg.

GILBERG, a town of Sweden, in Warmeland; 24 miles W. of Carslait.

GILBERT, Humphrey, in Biography, descended from an ancient family in Devonshire, was born about the year 1539. His mother, after becoming a widow, married Mr. Raleigh, by whom she had Sir Walter; of course, Humphrey Gilbert and Sir Walter were half brothers, and, as we shall see, both became distinguished in the annals of their country. The subject of the present article was educated at Eton, and from hence was sent to Oxford to complete his studies. He soon exhibited a turn of mind better adapted to an active than a literary life. He was early introduced to the court of Elizabeth, and there acquired that arduous of loyalty which seemed to be the ruling passion of those who approached the queen. His first expedition as a warrior was at Havre, in 1563, after which he was sent over to Ireland, to affilit in quelling the disorders in that country, and role to the chief command in the province of Munster. In 1570 he received the honour of knighthood as a reward for his services. In the following year sir Humphrey Gilbert served, as a burgess, in parliament, for Plymouth; and in 1572 he failed with a reinforcement to colonel Morgan, then acting in Flanders. He, about this period, became anxious for the advancement of maritime discovery, and the improvement and extension of trade and commerce; with these views, in 1576 he published "A Discourse, to prove a passage by the north-west to the East Indies." He probably designed to make attempts for the discovery of this passage, but an anterior project was that of settling some of the countries in the northern part of the New World. In 1578 he obtained a patent from the crown for making settlements in the unoccupied lands of North America, and fitted out an expedition with which he failed for Newfoundland, where he continued a short time, and returned without having effected any thing of import- ance. He, however, perished in his design, and in 1583, in company with his brother, sir Walter Raleigh, returned to Newfoundland, and took possession, in the queen’s name, of the harbour of St. John, and granted leaves of the circumjacent country to those of his company who chose to take them. He carried out with him a Saxon miner, in hopes, no doubt, of finding gold, more than sufficient to repay them for all their trouble and labour. This man pretended to have discovered a rich silver mine on the coast, and dug up some ore, which satisfied sir Humphrey that the means of wealth were within their reach. He now fully expected that he could obtain from the queen the loan of ten thousand pounds, to enable them to prosecute their discoveries, but his voyage was truly disastrous; the largest ship was lost in a storm, with all the crew except twelve men, and the miner and the ore perished at the same time. He himself had fortunately gone on board a small slop, for the purpose of exploring the coast. After this he refused to shift his station to his larger remaining vessel, being resol- ved not to desert the little crew with whom he had encountered so many dangers. He steered homeward, in the midst of a tempestuous sea, and on the ninth of September, when his small bark was in the utmost danger of foundering, he was seen, by the crew of the other ship, sitting in the stern of the vessel, with a book in his hand, and he was heard to cry out, "Courage, my lad! we are as near heaven at sea as at land." About midnight the bark was swallowed up by the sea; the gallant knight and all his men perished with her. Though sir Humphrey Gilbert did not effect a settlement at Newfoundland, yet the pro
ject was soon after realized under his patent, so far as to be of great advantage to the fishery from this country. Biog.

Gilbert, of Gilberts, William, a physician, was born, in the year 1540, at Colchester, 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 settled for the rest of his life. He was an intimate friend of famous men and with his much reputation and success, that he at length became first physician to queen Elizabeth, in which office he continued during the life of that prince. The vacancies from the duties of his profession he employed 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, 1603, 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 figure and cheerful countenance, is in the gallery over the schools at Oxford.

The capital work of Dr. Gilbert, entitled "De Magnet, Magneticisque Corporibus et Magnis Magnetis Tellure, Physiologia nova, plurium et 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 infallted on afterwards by the great lord Bacon. Aikin, Biog. Mem. of Med. Eley.

Gilbert, John, the son of Mr. Thomas Gilbert, a gentleman possessing an estate of about 300l. a year, was born in the year 1724. 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 possessed of extensive lime-works, 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 prosecuting improvements of his collieries, in the neighbourhood of Manchester. Mr. Gilbert's brother was then fled to the duke; and defirèd him to inspect and examine his Grace's collieries at Worlsey. After viewing the works, it immediately occurred to him, that if the coals 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 colliery, which, in the state it was at the time of his inspection, yielded little profit, would become extremely valuable. It is said, that he persuaded himself altogether from company for two days, at the Bull inn at Manchester, to consider how this might be done by water-carriages, 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 soon after begun. Mr. G.'s name was seldom occurred in connection with this very important and lucrative undertaking; and as he proceeded Mr. Brindley in this business, of which we have ample and satisfactory evidence, we thought that justice required a candid and impartial statement of the case. Mr. G. was so fortunate, in the prosecution of this work, as to find time upon the duke's estate, which, until otherwise have been brought by land from Buxton, at the distance of near 30 miles; and in a work of this great extent, this was no inconsiderable 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 elegant workman, engaged his assistance in the conduct and completion of this 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 Worlsey, that he might, with greater convenience, attend the prosecution of the business he had undertaken. As a farther 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 bell preferment at his disposal, to the amount of about 1500l. 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-power 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 73 years, which happened at Worlsey, 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, N. lat. 55° 15', W. long. 71° 5'.

Gilbert's Town, a town of America, in the state of Virginia, seated on the Shenando, 30 miles N. of Charlotteville.

Gilbertines, in Ecclesiastical History, an order of religious, thus called from St. Gilbert, of Sempringham, in the county of Lincoln, who founded the name 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 Angelicus, in Biography, the first practical writer on medicine, whom this country produced, places by Bale, (who calls him Gilbertus Lugdun. and says he was physician to Hubert, archbishop of Canterbury,) in the reign of king John, about the year 1210. But Lehnard, 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 Physic,"(?) 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 Averroes," 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, at least, of the thirteenth, as Bacon, a good voucher, informs us; and the mention he makes of a book, "de Speculis," which, without doubt, is that written by Bacon, and what he transcribes from Theodorick, concerning a leprosy, evidently shows that he lived low in this century, &c." (Hist. of Physic, vol. ii. p. 267.) According to Lehnard, 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 transcribes whole chapters word for word, especially from Razes. He is represented as the first English physician who ventured to expound 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 universalium quam particularium," was corrected by Michael Capella, and printed at Lyons in 1510: and afterwards at Geneva, in 1612, under the title of "Laurus Anglicana, seu Compendium totius Medicinae." His other treatises were, "De viribus Aquarum;" "De Re Hierbaria;" "Thefaurus Puerorum;" and "De tundae valutudine." Elov. Dict. Hist. Freind, loc cit.

GILBING, in Geography, a town of Prussia, in Ermland; 12 miles W. of Allenstein.

GILBOA, in Scripture Geography, a mountain of Pa- laistine, celebrated on account of the defeat and death of Saul, and his son Jonathan. (1 Sam. xxxi. 1, 2, 3.) Ezech. and Jerom place this mountain six miles from Bathfin, otherwise Scythopolis.

GILD, or GUILD, originally signifies a fraternity, or company.

The word is formed from the Saxon gildan, to pay, because every man was gildar, i.e. to pay something towards the charge and support of the company. Hence also our Guildhall, q. d. the hall of the fraternity 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 fix sureties to keep the peace, or be committed; cert in neighbours, confining 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 fock; and when one of their pledges had committed an offence, and was fined, then the other nine made satisfaction out of this fock, by payment of money, according to the offence.

Because this association consisted of ten families, it was called a dencurnery; 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. 76, that merchant-guilds, or fraternities, which were afterwards styled corporations, came first into general use in many parts of Europe. Mr. Madox, in his annals, 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 sisters, with a master, or warden; and that they might found chapteires, 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 free men of the borough.

Every royal borough has a dean of gild, who is the next magistrat 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 fock of the gild; and amerce, and collects fines.

GILD, or GUILD, according to Camden, also signifies a tribute, or tax. See GILD.

GILD, according to Crompton, also signifies an amercement. As in foot-gild, which he interprets a prelation within the forest.

Hence, to be quit of all manner of gild, is to be discharged of all manner of prelations to be made for gathering leaves of corn, lamb, and wool, to the use of folellers.

GILD, or GUILD, is also used among our ancient writers for a compenation, or mulct, for a fault committed. See UN-GILD.

Hence, sergeld is the price of a man; osgei'd is the price of a cattle; angeld, the single value of a thing; rengeld, the double value, &c.

There are divers other words which end with gild, and shew the several kinds of payments; as dangeld, vanegild, fornegild, bobergild, fortgild, punigild, &c. which fee.

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.

GILDABLE, or Gildable, denotes a person tributary, that is liable to pay tax, or tribute.
Camen, dividing Suffolk into three parts, calls the first gildable, because liable to tax; from which the two other parts were exempted, because ecclesiastical domestes.
Gildable is also explained in an ancient MS. to be that land or lordship which is subjunctio curie vicem.

GILDAS, in Biography, surnamed the Wise, 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 Albanus, 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 success 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-carvan, 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 Cliftonbury, full twenty years prior to this. The chief work of this author is: "Epitome de Excidio Britanniae, et Cafligatione Ordinis Ecclesiastici," containing lamentations over the miseries and almost total ruin of his countrymen, and very severe reproofs of the corruption and profiriolity of manners in which all ranks were sharers, and of which he drew a most alarming picture. This curious remains of British ecclesiastical antiquities was first printed by Polydore Virgil in 1525, from an imperfect copy. It was afterwards published in 1568 by John Jofleline from another, and a more perfect manuscript copy, but the best edition was published by Dr. Thomas Gale, in the first volume of his "Histoire Britannica, Saxonica, &c." Gildas wrote several "Letters," in 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 "Histoire de Gelles Brittonum." Moreri.

GILDAN-Da-Bais, St. in Geography, a town of France, in the department of the Lower Loire, and chief place of 2 cantons, in the district of Savay. The place contains 659, and the canton 5527 inhabitants, on a territory of 255 kilometres, in five communes.

GILDER. See Gilder.

GILDHALDA TEUTONICORUM was used for the fraternity of Easterling merchants in London; called also the Stileyard.

GILD-HALL, q. d. Gilda asta, the chief hall in the city of London. See Gild-hall.

GILD-MERCHANT, Gilda Mercatorum, 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 gildam 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 endue them for ever. 10 Rep. 30. 1 Roll. Abr. 515.

GILDING, or GULDING, 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 process employed for gilding in this manner, the horns of the ram brought by Neffer, as an offering to Minerva, in Homer’s Odyssey, i. iii. v. 492.) In process 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 affords us, that the first gilding seen at Rome was after the destruction 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 Seneca, (Ep. 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 same 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 brattac Primflata, an account of a statue of the goddess Fortune at Frantide, gilt with such leaves; and that those of the thinner sort were called brattac quaeterie.

The modern gilders also make use of gold leaves of divers thicknesses; but there are some so fine, that a thousand do not weigh above four or five drachms. 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 size; 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, leucophrey, or leucophrex;
which is described as a fort of glutinous compound earth, serving, in all probability, to make the gold flake, 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 aline fire; gilding on a water fire; 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, flax, gilded and japaned 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 glass and porcelain.

There are two methods of gilding on wood, viz. oil-gilding, and burnished gilding.

Gilding in oil, or on an oil fire, 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 rife six inches or more above the bottom. Let the vessel be exposed to the sun and rain, and the contents be occasionally stirred 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 neatness and perfection in the work be required, the wood should be first rubbed with fift-skin, and then with Dutch rufhes.

When the priming is dry, the next operation is that of fixing the work, or laying upon it, by means of a brush, or a large pencil, a thin coat of gold fize; 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 fize is prepared by grinding calcined red ochre with a due proportion of the fat, or thickest drying oil that can be procured; (the older the better); and this fize, in order to fit it for working more freely, is to be mixed, previously to its being used, with a small quantity of oil of turpentine, till it acquires a proper consistence. Sometimes the work is fixed with fat oil, and the Japanese gold fize (see Gold Fize), ground also with ochre. If a high degree of perfection be required, the work should be fixed a second time, and some add a third fixing, 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, “stuck,” 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 clannyness or sticking quality, it is too dry, and must be fixed over again before it is gilt. When the gold fize 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 entirely, 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 settled to the ground, by gently compripling 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 dis placed, so as to leave any part 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 lips 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 lips, of a proper size, by a blunt pallet-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 Tips), 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 parts of the work that were to be covered, they are gently pressed down by the cotton ball, till they lie every where evenly upon the ground; and the gold will immediately adhere to the flaky surface of the fize. 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 fitch pencil, first breathed upon, and thus conveyed to, and settled 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 hog’s hair brush, in order to clear away any loose particles of the gold leaf. If, after bruishing, 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-hick, 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 fize, 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 lustre which is produced by the method we shall next describe.

Gilding, Burnished, or in Stipple, or on Water-fire, is that kind of gilding which is generally used for picture frames, mouldings, tafaces, 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 fift-skin, and then with Dutch rufhes. It should then be carefully covered with strong fize, made of shreds, &c. of white leather, such as that used by glowers, or clippings of parchment boiled in water, in the proportion of about a pound of the
the fards or clippings, to fix quarts of water, to the con- 
sistency of a jelly, and then strained through flannel while 
hot. When this coating is dry, eight or ten more must be 
applied, confining of the fame fize, mixed with fine fluter 
of Paris, or washed chalk, or powdered whitening; which 
mixture must be made by melting the fize, and flow- 
ing the whitening, &c. gradually into it, tarring them well 
together, that they may be thoroughly incorporated. This is 
laid on with a fift brush, and often or seldom repeated, 
according to the nature of the work; for pieces of sculp- 
ture, seven or eight layers suffice; 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 dubbing it finely on, that the fize may enter all 
The dents of the carving.

After the falt 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 per- 
efcntly even. The work should then be repaired, by freeing 
all the cavities from the priming; after which a water polifh 
should be given to the parts designed to be burnifhcd, 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 fize and bole, 
or yellow ochre. Doffic, in the Handmaid to the Arts, gives 
the following recipe for the fimpflef compositions, used as 
the proper cement or gilding fize in this kind of gilding: 
"Take any quantity of bole arseniac, and add some 
water to it, that it may ftoak till it grow fowt. Levigate it 
then on the flone, but not with more water than will pre- 
vent its being of a flift confidence, and add to it a little 
 purified fuet or tallow scraped; and grind them together. 
When this is wanted for use, dilute it to the confidence 
of cream, by parchment or glovers' fize, mixed with double 
its quantity of water, and made warm. Some melt the 
flut 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 alfo fometimes prefufed to put foap fuds 
to the bole; which will contribute to its unifying with the 
tallow." (See Gold Size.) Let this composition be diluted with warm fize mixed with two-thirds of water, and 
let it be spread with a brush over the whole of the work, and 
then fuffered to dry; and then let the fame mixture be ap- 
piled in the fame manner, at least once more. After the faft 
coat, it should be rubbed in the parts to be burnifhed with a 
soft cloth, till it be perfectly even. Some add a little ver- 
milion to the gilding fize, and others colour the work, if 
carved, before it be laid on, with yellow and the glovers' 
fize; to which a little vermilion, or red lead, fould be added. 
This laft 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 neceffary to be laid on. But 
this practice is much difputed; and instead of it fuch parts 
of the work are coloured after gilding; which operation is 
called "Matting."

The work being thus prepared should be laid 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 
moiftened 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 moiften the next part of the work, and apply the gold as 
before, repeating the operation till the whole is completed. 
It, in examining the work, any parts should appear to need 
being repaired, they should be moiftened 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 fo easily 
mended as in oil-gilding; nor fhould any drops of water be 
fusfured to fall on the perfect part of the gilding, as the gold 
is very apt to turn black in this fate. The work being 
thus far gilt, when dry, and fit for the purpofe, which it 
will ufually be in about twenty-four hours, remains, either 
to be burnifhed, or matted.

The proper period for this purpofe can only be afcer- 
tained by experience, and varies at different seasons. The 
mode of diftinguifhing the fitnefs of the work to take the 
burnifh, is to try two or three particular parts at a distance 
from each other; and if these take the polifh well, the whole 
may be concluded to be in a fit flate. But if the gold peel 
off, or be disordered by the rubbing, the work must be 
deemed not sufficiently dry; and if the gold bear the rub- 
ing well, and yet receives the polifh favourably, 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 re- 
quires much more labour to burnifh it, and fails at laft of 
taking fo fine a polifh.

To burnifh it, is to smooth and polifh it with a burnifher, 
which is ufually a dog's or wolf's tooth, or a blood-flone, 
as agate, or a pebble, or something else very smooth, fitted 
in a handle for that purpofe.

To mat, is to give it a light fick in the places not burn- 
ifhed, with a pencil dipped in fize, wherein a little ver- 
milion sometimes has been mixed. This helps to prefev- 
er it, and prevent its flawing, when handled. Or, it is to cover 
the hollow parts with a colour the nearest in appearance to 
gold.

Some recommend for this purpofe red lead, with a little 
vermilion ground with the white of an egg; but yellow 
ochre, or Dutch pink, with red lead, would better an- 
swer the end; or the terra di Siena, very flightily burnt, or mixed 
with a little red lead, would have a much better effect, and 
be more durable than any other mixture to near the colour 
of gold in shade. Flints fize will likewifesupply the 
place of the whites of eggs. This operation of matting 
impofitcs the neceffity of yellowing, which is intended to 
give the appearance of gilding to the deeper and obscure 
parts of the carving where the gold cannot, nor is thought 
necelTary to be laid on.

The laft thing is to apply a vermeil, or lacquer, in all the 
little lines and cavities; and to flop and amend any little 
fauls with shell-gold.

The composition here called "vermeil," is made of gum 
gutta, vermilion, and a little of some ruddy brown colour, 
ground together with Venice varnish and oil of turpentine. 
Some gilders, in lieu of this, content themselves with fine 
lacca, or dragon's-blood, with gum-water.

Sometimes, instead of burnifhing the gold, they burn- 
ifh the ground or composition laid on laft before it; and 
content themselves afterwards to wash the part over with fize. 
This method is chiefly practifed for the hands, face, and 
other nuditites in relievo; which, by this means, do not ap- 
pear so very brilliant as the parts burnifhed; though much 
more so than the parts perfectly flat, or matted.

To gild a work, and yet preferve white grounds, they 
apply a layer of Spanish white mixed with a weak flin-glue, 
on all the parts of the ground where-on the yellow, or the layer next under the gold, might 
run.
GILDING.

Gilding, Japanese, 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 Gold size. This kind of gilding may be practiced on almost any substance whatever, whether wood, metal, leather, or paper; nor is there any preparation necessary, besides making the surface on which the size is to be laid, even, and perfectly clean. Then spread the chosen 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 defined, avoiding carefully any other parts; when it is almost dry, to as to be capable, by its camminias, of receiving the gold, dip a piece of washe-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 sizing 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 ornaments of brass 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 weight. For plain picture frames, thick tin-foil may be used instead of silver; the tin leaf fixed on with glue is to be burned off, 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 Lacquer.) Among the false gildings may also be reckoned those which are made with thin leaves of copper or brass, 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定义false 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 flick together, the false size, melted with the addition of some common proof spirit of wine, and thus a 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 consistence; and the cement will be fit for use. In applying any of these cements, the paper, inquires or in books, should be well cut and polished on the edges to be gilt; and well screwed down by a press; in this state it is to be brushed over, first with a little of the cement without the sugar-candy and 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 lightly 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 pressed 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 liked in a wafer not that it is very liable to get its lustre, 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 mischief 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 vessel, upon which they would revive the lustre 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 new fretches, but recovers its primifine 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, for les Costumes de l'An. See Porcelain.

Gilding on enamel and glasses, is performed by burning or annealing, i.e. by producing a cohesion of the gold with the glaze or enamel, by the intermediate action 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 glaze, in consequence of the fusion or annealing to that state, either of the flux used, or of the body of the enamel or glaze itself, by which the gold is cemented to such body. The flux, when any is used, may be either simple glasses 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 glaze 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 sticky, and then laid upon a sufficient number of leaves of gold: when the gold is thus united to the enamel or glasses 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 fuliginosum, or precipitation of gold by alkaline salts, is made by those who gild plates in the greatest perfection; and the volatile alkali 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
Gilding.

Heat applied. The manner of using the precipitate powders of gold; the aurum fulminans 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 spike, and worked as the enamel colours; and the quantity of flux, when any is used, may be a third of the weight of the gold. In casks where the glaes 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 glaes of borax to a fine powder; and having tempered it with oil of spike, lay it on the glaes where the gilding is to be made; then burn the glaes 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 casks. After the work is burnt, if it be intended to be burnished, a proper luttre 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. 1 p. 374, &c. See Ruby Glass.

Gold may be laid upon white earthenware or glaes, by drawing your design upon the vessel to begin, with japanners' gold size, moistening the size, 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 tacky or clammy; then, having procured a cushion and home leaf-gold, cut it into flakes 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 glases, 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 glaes so as not easily to be rubbed off. He tried maltish, and other golden bodies rubbed warm on the glases, and several spirituous varnishes; but none of these were found to adhere sufficiently to the glases. He recommends to the trial of the artists in this way the harder oil varnishes; and glases 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 "Commercial 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 braze 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 sooner, 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 glass, 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 tooth or file burnisher, and the gold. This gilding, M. Zeigler observes, is durable, and of a fine lustre. Com. Phil. Techn. p. 65, and 614.

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-ammoniac made in water, and gold-leaf applied upon them when almost 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 procured by tempering pulverized crystalline 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 polishing, 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 flakes, when they are used, is anointed evenly with a feather dipped in oil. Then fill these concave letters with the above paste, and strike the flakes 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 verminum as is necessary to give them the consistence of paste; use the flakes as before; and when the letters are dry, moisten them by a small pencil with strong gum-water; and when this is almost dry, cover the letters with leaf gold, pressing 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. 453 &c.

Gilding of fitch-fitch, as craw-fish, carps, &c. may be performed without injuring the fish, by means of a current which Mr. Hooker, in his pithumous 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 fill it; mix and stir it; then draw some finely powdered amber over the pitch when growing cold; add a mixture of three pounds of linseed 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 pomice-stone in fine powder as will reduce it to the consistence of paste. 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-stone, and a certain degree of heat, are made to adhere perfectly well. In this manner silver leaf is fixed and burnished upon brass, 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-stone 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 point, 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 pressure without injuring the evenness of the gilded surface. In casks where these objections do not apply, there cannot be a more effectual
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Effectual mode of gilding, as we perceive in the manufacture of gilt silver and copper wire. The first, before it is committed to the wire-drawer, is plated with gold, by having several leaves of gold successively burnished down upon it, and being then subjected to the strong compresion 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 Wire.

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 silver, well cleansed from any minute matter, with a wet linen rag, dipped in salt water, and the particles of gold contained in them will thus be applied to the silver, and adhere to it, without the application of heat, or intervention of any other body. Burnish the silver with a blood-lime, till it acquires the colour of gold. Most gilt ornaments on fans, manuscript-boxes, and other toys of much value, and silver gilt in this manner.

Beckmann (Hist. of Inventions, vol. 1) tells us 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 Southwell describes 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. For the most part, size, properly so called, and gum-water, are used as the emulsions, 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 designed ground by means either of gum-water, or spirit of lamp oil; 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-lime, 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 make a impression of the intended figure or design. In this kind of gilding, the japanner'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.

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 fifth of its weight of fine gold in thin plates heated red-hot, and stir them gently about, till the gold be found dissolved, and is 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, consisting 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 silvery mass, of the con-"fiuence 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 ceases 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 inestimable 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 amnatic acid, so that the surface may be rendered perfectly clean; it is next 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 hairs or wires, for the purpose; and giving the work a gentle heat before the fire, he dabbs 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 fort of cag, under which is a pan of charcoal, yielding a heat just sufficient for evaporating the mercury; by which means the mercury, dissipated in fumes, and leaves the goldople 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 is 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 luster are heightened. For this purpose, it is first rubbed with a scratch brush, composed of fine brass 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;
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The colour of the gilding is heightened by a perfect dilatation of some mercury remaining after the former operation. The gilt surface is then covered over with a saline 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 diversified 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 gilted 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 fold 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 success 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 frequent 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 mercuial salt is decomposed. The copper takes the place of the mercury, and at the same time the mercury is deposited in the metallic state, on the surface of the copper, covering it entirely, and strongly adhering to it. The gold amalgam is now applied, and the result of the process is the same with that which has already been 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 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 practised; that is, the parts of the steel to be gilded are pickled over with nitrat of mercury, by which they are covered with a slightly adhering coating of mercury; then the amalgam is applied, and the gilding finished in the usual way. The objections to this process are, firstly, that a con siderable 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 coat of metallic copper 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. x. 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 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 either, thus charged with gold, is spread, by means of a pen or fine brush, on the surface of highly polished steel, the ether preternaturally 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 dermaids, and especially the rapid volatility of ether, are objections of some moment, but may be got over by using the burnish 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, sooner or later, have their health greatly impaired by them; the other, the loss of the mercury; for though part of it is said to be retained in the cavities made in the chimneys 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 ash-pit 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, enters now at the top, and passing down through the grate to the chimney, carries with it completely both the vapour of the fuel, and the fumes of fuel 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 into running quicksilver, which falling down to the bottom, is there caught in a hollow ring, 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 earthenware and glass, which is, to fuse gold with regnium of antimony, to pulverize this mass, and
and spread the powder upon the piece to be gilt; afterwards to expose it to such a fire that the regulus may be evaporated while the gold remains fixed. But Dr. Lewis mentions the following inconveniences 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 regulus; glass is liable to the heat necessary for the evaporation of regulus of antiquity; and copper is liable to be corroded by the regulus, and to have its surface rendered uneven. Lewis’s Com. Phil. Techn. p. 77, &c. p. 81. 88. and 165. Macquere’s Dict. Chem. Eng. edit. 1777; and Aikin’s Dict. of Chemistry, art. Gilding.

Gilding Cufflink, is formed by a few folds of flannel, or a quantity of tow or wool, secured on 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 last. This knife may in all respects be the fame as those used in painting, called “pallet knives;” the blade of which may be four 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 Tcep. 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 article to be gilded.

Gilding Wax. See Gilding of Metals.

Gildo, in Biography, a powerful lord in Mauritian, served the emperor Theodotus, in his brother’s revolt in 573, 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 diffusions between the eastern and western empires, he was persuaded by the minister Eutropius to acknowledge Arcadius: 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 Maufezel, in which the latter had taken refuge in the court of Honorius. Gildo, with a brutality that can never be sufficiently excoriated, fattated his disappointed vengeance upon the two children of his brother, whom he barbarously murdered. Massezel, anxious for revenge, landed a body of troops in Africa, and encamped in the face of a numerous army of Moors collected by Gildo. Thence, 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 saved 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 panegyrics, to the honour of Stilocho, who was the commander in it, against the subject of this article. Gibbon. Univer. Hist.

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 Eusebius mount Gilead reached from Libanus northerly toward 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. viii. 22. xlvii. 11. xii. 8. Gen. xxxviii. 25. See Balsam. Gilead derived its name from Gael-hard, g. d. the heap of witwes, in reference to the heap of stones raised as a monument of the covenant between Jacob and Laban. Gen. xxxvi. 21.

Giles, in Biography, a learned Italian prelate, and cardinal of the sixteenth century, distinguished himself by the progress 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 Augustina. In 1507, he was raised to the post of general of his order, and was employed by pope Julius H. 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 Conflatantinople. He died at Rome in 1532, and left behind him a very high character for learning. He was, during his life, perpetually confounded in difficulties that occurred to the literature 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 “Amphithea 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.

Gilmor, in Geography, a small poit and market town of the county of Down, Ireland. The river Bann runs through the centre of it, over which there is a very handsome bridge, highly ornamented with hewn stone, of twenty-two arches. It is a handsome neat town, and the country about it is highly improved; the housetops are good, and chiefly inhabited by wealthy and reputable linen-drapers. The linen trade is carried on very extensively here, and the cloth is so 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 Moyall. Through Gilford, on the borders of the Bann, for a continuance of fix miles; the river in delightful meanders, the rising grounds surrounding it adorned with woods, and the bottoms variegated with bleached greens, afford views the most beautiful and picturesque. Gilford is 622 miles N. from Dublin, and 11 miles from Armagh.

GILCAL, 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.

GILCE, in Geography, a town of Thrullin, in the circle of Sandland;
2. G. heterophylla. (Quivicia ovata; Cav. n. 553, t. 214.)—Leaves oblong, undivided, sinuated, or pinnatifid. Flowers four-leafed, ovoid, somewhat umbellate.—Gathered by Commerçon 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 oblongate and blunt, or somewhat pointed, and either undivided, or more or less finely waved or sinuated, or deeply and accurately pinnatifid like an oak-leaf; all these varieties are found on the same specmen, nor can we separate Quivicia 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. 

Capul the size of a pea, pointed, slightly silky.

3. G. oppositifolia. (Quivicia oppositifolia; 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 few the flowers. The fruit is rather umbellate than racemose, the size of a large pea, furrowed, depressed, clothed with shining waxly down, and opening into four or five parts on the same branch.

GILMER, or GILMARI, in Biographie, half king of the Vandals in Africa, a descendant of Gereric, succeeded to the throne of his deceased cousin Hilderic. The emperor Justinian joined the cause of the dethroned sovereign, and determined to annex the African provinces once more to the Roman dominions. Belisarius was chosen to execute the design, who failed in 533. Zano, the brother of Gilimer, was, at this time, engaged in the conquest of Sardina, by which circumstance the force of the Vandals was divided, while a considerable party at home still adhered to the late king Hilderic. Gilimer assembled his troops to redress the invaded, but being defeated with great slaughter he was glad to re-
tire to the Numidian defects, having first exercised the tyrant's policy, by commanding the execution of Hileric and his captive friends. Carthage submitted to the victorious Belharis; but Gillimer 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 Gillimer 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 afflicting by its contrast with the luxury and effeminacy in which he had been accustomed to live. So deplorable was his situation, that he is reported to have applied to Pharus for a lyre, a siphon, and a loaf of bread; the first he said was to soothe his sorrows; 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 distresses at length obliged him to submit to the conqueror; he defended to the mountains, and followed Belharis to Conflantinople, 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 showed him much attention and kindness; he would have raised the fallen monarch to the dignity of patrician, could he have been persuaded to renounce the Arian doctrine, in which he had been educated. He was put in possession of a large estate in Galata, where, in the bosom of his family, he ended his days in peace. The extinction of the Vandal kingdom in the person of Gillimer is to be dated from the year 534. Gibbon. Univ. Hist.

GILLION, in Geography, an island in the East-Indian sea, about 36 miles in circumference. S. lat. 7° 6'. E. long. 114° 37'.

GILLS, St., a town of France, in the department of the Schelkt, and chief place of a canton, in the district of Ternonde. The place contains 3228, and the canton 16,770 inhabitants, on a territory of 95 kilometres, in 65 communes.

GILTZSTAIN, 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 1697, and discovering, when very young, an uncommon capacity for learning, his father, who was a dissenter of the Baptist persuasion, sent him to a grammar-school in the neighbourhood, where he soon out-kinpt 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 narrow 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 nineteenth 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 Higham Ferrers to prosecute a regular course of studies under Mr. Daws, 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 1774 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. Whilton's Essay towards restoring the true text of the Old Testament." In the year 1738, 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 unwearying 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. Biol.

GILL, in Botany. See GLECHOMA.

GILL, in Geography, a township of America, in the state of Massachusetts and county of Hampshire, situated on the W. bank of Connecticut river, 90 miles from Boston; containing 700 inhabitants.

GILL, or Bich, 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 = 8.8125 cubic English inches = 1.220779 wine gills = .0160984 cubic links.

Gill of wine, cider, oil, &c. = 1-4th of a wine pint = 7.21875 cubic English inches = 8.91490 ale gills = .0145307 cubic links.

Gill, Scotch measure, = 1-4th of a mucklekin = 1-16th of a Scotch pint, the cubic content of which varies much in different places. See Scotch Pint.

GILLAROO, Trout. See Trout.

GilleM's Bay, in Geography, a bay on the S. coast of the island of St. Christopher; two miles W. of Basil-terre.

Gille-le-Vicomte, St., a town of France, in the department of the North Coast; six miles N.N.E. of Gungamp.

Gilles-les-Boucheries, St., a town of France, in the department of the Gard, and chief place of a canton, in the district of Nîmes; 10 miles S.S.E. of Nîmes. The place contains 5574, and the canton 6557 inhabitants, on a territory of 180 kilometres, in 2 communes.

Gilles-Sur-Vic, St., a town of France, in the department of the Vendée, 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 759, and the canton 12535 inhabitants, on a territory of 4321 kilometres, in 17 communes.

Gilles, Peter, in Biography, was born at Abbe in 1492, and became distinguished as a scholar and traveller. Having acquired an extensive knowledge of the learned languages,
gases and the philosophy of the times, he set out on his travels with a view of making observations in natural history and antiquities. On his return he was introduced to the notice of George de' Amargana, bishop of Rhodes, who engaged him to compose his book "De Vrct Natura Anim.

This work, which consisted of extracts from Allian and others, with observations of his own, he dedicated to Francis I., who sent him to travel in the Levant, but without furnishing him with proper supplies, so that he was reduced to great difficulties, and was obliged to enlist in the troops of the sultan Soliman II. for subsistence. He left Constantinople in 1550 and went to Rome, where he died 1555. He was the author of two geographical works, "De Bosphoro Thracic," and "De Topographia Constantinopolae," which are esteemed for their learning; and also of some translations from the Greek. 

GILLESAY, or GILLISAY, in Geography, one of the smaller Hebrides, between Lewis and North Uill. N. lat. 57° 45'. W. long. 6° 59'.

GILLESAY Point, a cape on the S.W. coast of the island of Cebeles. S. lat. 5° 15'. E. long. 119° 48'.

GILLESKAIL, a town of Norway, in the diocese of Drotnenheim; 240 miles N. of Drotnenheim.

GILLETTE, a town of France, in the department of the Maritime Alps, and chief place of a canton, in the district of Puget-Théniers. The place contains 456, and the canton 1712 inhabitants, on a territory of 105 kilometres, in four communes.

GILLIAN, GUILSAIN, or Ghillieain, St., a town of France, in the department of Jemmappe, situated on the river Hainne and surrounded by marshes, and deriving its name from a celebrated abbey founded in the year 651 by Gillian, the friend of St. Amand. Having been successively in the possession of the Dutch, the French, and the Spaniards, and of the allies, it was taken by the French in 1792. St. Gillian was called the key of Mois, and is distant three miles W. of it.

GILLIFREE. See JILLIFREE.

GILLINGHAM, a parish in the hundred of Chatham and Gillingham, Kent, England; is seated on the river Medway, at the distance of two miles from the town of Chatham, and 32 from London. It contains 715 houses and 4133 inhabitants, the greater part of whom are immediately or indirectly employed in the business connected with the neighbouring dock-yards. This village, though now deprived of its consequence by the increase of Chatham, was formerly of much note. In the time of queen Elizabeth here were four quays, and twenty-seven ships and boats; the largest of these, however, was only twenty tons. The archbishops of Canterbury formerly had a palace here; one of whom, John Stradford, in the tenth year of Edward III.'s reign, obtained a charter for a weekly market, and an annual fair to continue eight days; but these have been long discontinued. William of Gillingham was a native of this place. He was a monk of Canterbury, in the time of King Richard II., and wrote a history of Britain; also one of his own monastery. Hallel's History of Kent, vol. iv. p. 80.

GILLI, 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 Gilli 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 Ichthyology. See Fish, Organ of Respiration.

GILLS, Leaf of the. See Folium branchiastum.

GILLYFLOWER, in Gardening, the common name of a fine fragrant flowery plant, common in gardens, &c. See DIANTHUS.

GILLYFLOWER, Queen's. See Hesperis.

GILLYFLOWER, Stalk. See CHIRANTHUS.

GILLY-LAVAS, 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 that variety of charming prospects which belong hills, wooded lawns, and large islands clothed with verdure and crowned with trees, united with a great extent of water, cannot fail to produce. Beaumar.

GILMANTOWN, a post-town of America, in Strafford county, New Hampshire, S.W. of lake Winnipesaukee, and 52 miles N.W. of Portsmouth; incorporated in 1727, and containing 3752 inhabitants.

GILMARGUEY, a town of Hindoojan, in Downetabaud; 13 miles N.E. of Nander.

GILIOH, or GELO, in Scripture Geography, a town of Palestine, situated in the mountains of the tribe of Judah. Josh. xv. 41.

GILIOLO, in Geography, one of the Molucca islands, in the East Indian ocean, of considerable extent, and in its irregular form resembling Cebeles, which see. Its length is about 230 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 Meeja; but the sultans of Ternate and Tidore now seem to share it between them, the former polishing the northern part with Mortay, Bakian, Motir, and some Celebesian islands, and part of Papua; while the sultan of Tidore holds the southern part with Myofel, and some other isles. One of the chief towns is Tatany, situated on a point or promontory of the eastern limb, faced with precipices, so as to be accessible only by ladders. Gilolo abounds 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 clowns and nutmegs. The natives are industrious, particularly in weaving; but their exertions are suppressed by Batavian jealousy. The equinoctial runs through the southern part of the island. E. long. 128°.

GILP LOCH, in Argyleshire, Scotland, is a kind of gulf branching from Loch Fine on its W. side, which is navigable for vessels to the entrance of the Crinan channel, through which they pass to Loch Crinan, and the Irish sea. See CANAL.

GILPIN, BERNARD, in Biography, was born at Kentmore, in Wellmoreland, in the year 1517. He was defined by his parents for the church, and educated with that view. At fifteen 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 so 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 Woffley's new foundation at Christ-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
the popular religion, for he even entered into a vindication of the Catholic doctrines in a dispute with Hooper, afterwards bishop of Winchester. The discussion 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 provoke. At length, however, he consented 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 prented 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 pleased, but Gilpin's discourse was a serious and very bolting reproof on the prevailing avarice and corruption of the age; he spared neither the court, clergy, magnates, 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 Townfall, bishop of Durham, at that time a prisoner in the Tower, under a sentence of mifprision of 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 Townfall, 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; saw 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, Townfall 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 Townfall, who received him with great friendship, and presented him with the archdeaconry of Durham, to which he annexed the living of Infington. He now repaired to his parish, determined to do what good he was able in reprobating 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 diffimmed. 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-Spring, 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 prefented 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 believe this preference 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 manifeftly 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 Townfall was vexed that he should carry his piety and zeal to what he thought an excess. The malice of Mr. Gilpin's enemies was not satisfied with the loss which he had experienced in his uncle's esteem; 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 messenger. 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 mericles favage might now gnash 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 converse 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 likewise 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 always in preventing lawsuits among his parishioners, and his hall 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 visitor at the houses 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 not himself to perfections 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 hof, 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, "There 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, Wiltshire, and Cumberland; and that his own flock might not suffer, he was at the expense of a constant attendant. In all his journals he did not fail to visit the great and small places of entertainment; and by his labours and affable manner of behaviour, he is said to have re-formed 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 affix 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 discoursing he had a sort of enthralling warmth, which roused 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, abundantly compensated by the advantages which he hoped would accrue from them to his un instructed fellow-creature. 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 best friends dreaded the result; they rebuked him for giving the prelate a handle against him, to which he replied, "If the discourse should do the good he intended by it, he was regarded of the consequences to himself." He then waited on the prelate, who said, "Sir, I propose to wait upon you your self." 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 fitter to be bishop of Durham, than I am to be parson of this church of yours. I ask forgiveness for palf 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 retort of young people to it, that in a little time the town was fearfully afraid 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 fatigues 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 confinement, he was able to get out, but continued lame as long as he lived. He died in 1583, 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, deserve to have his name transmitted to posterity with respect and reverence, and who obtained, and most deservedly among his contemporaries, the title of the Northern Apostle. By his unwearied application he had amassed a great flock of knowledge, and was indeed ignorant of no part of learning that at that time was in fashion. He had given more than common attention to the study of the dead languages, to history 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. *Biot, Brit.*

**GIMESCH** in *Geography*, a town of Würtemberg, 25 miles E. of Tubingen.

**GIMMER** in *Agriculture*, 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.

**GIMMERLING**, in *Sea Language*, is applied to the anchor, to denote the action of turning it round by the block, so that the motion of the block appears similar to that of the handle of a gimlet, when it is employed to turn the wire.

**GIMBOLS**, denote the braies-rings by which the seacompas is suspened in its box that usually stands in the balanc.
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 Pe-cheli; 10 miles S.E. of Chunch-te.

GIN, formed probably by corruption from engine, 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 cheeks, that are fastened to these poles by two iron bands 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 dolphins of a gun or mortar with another windlass, containing likewise two brafs pulleys, and the other pulleys through the pullies 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 fet of pullies, 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) hanging across a tree to be raised and loaded: the gin-rope is then reeled through a moveable block of pullies, fastened by a chain to the tree, through that in the top of the gin and round the roll; and then, by means of handspikes or levers used to the roll, the tree is drawn up to a sufficient height for the timber-carriage to be passed under it. Long trees are raised at one end first, and two of the wheels of the timber-carriage are passed 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 passed 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 a circle, and used for raising coals 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 buckets defends 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 hollow 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, so as to employ two horses, and even four in some caves, with a box to each pair, or single horse, to stop and turn them, so as to draw from the other side of the lever, as often as a corve or bucket arrives at the top of the shaft. See the article Coal.

The increasing depth of the pits, and demand for coals at Newcastle, occasioned Mr. Smeaton, the engineer, to be applied to in the year 1777, by the proprietors 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 superseded 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 corves 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 pullies over the shaft; and usually as one bucket or corve 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 corve has arrived at the top of the mine-shaft.

GINATIRI, in Geography, a town of Africa, in Kumbo.

GINANNIA, in Biaury, so called by Scopoli and Schreber in memory of Count Joseph Giannini, a native of Ravenna, whose palpitumus works in Italian, composing two folio volumes, with above 60 plates, were published at Venice in 1755. They chiefly relate to the marine productions of the Adriatic, as corals, sea, a few shells, &c. but are perhaps not too feverly characterized by Linnaeus, in a letter to Gerard, as of no manner of uie. The author was recommended to the study of natural history by his friend Valfiner, as a cure for hypochondriacal 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. Polave; Juff. 351. Brownca paciforum; Wild. Sp. Pl. v. 3. 716.) See Brownsea, to which genus we are parasized this plant is really referred by Willdenow at the suggestion of Sreber, Addend, 829. The stem is thrubly, 15 feet high, branched, the branches alternate, straight or declining. Leaves simple, alternate, nearly felse, ovate, entire, pointed, smooth and shining. Stipulae minute, acute. Flowers terminal, few, red, large, and handformc, their short flanks enveloped in large concave imbricated bracteas. Leaves reddish, linear, compressed, three inches long, somewhat like that of Ceris filifera. Native of the forests of Guiana, flowering in February, and bearing fruit in May.

GINASSERVIS, in Geography, a town of France, in the department of the Var, and chief place of a canton, in the district of Brignoles, nine miles N.W. of Barjols. The place contains 752, and the canton 8oo inhabitants, on a territory of 5214 kilometres, in 44 communes.

GINIKUS, in Ancient Geography, a town of Asia, in Syria, situated on a mountain, E. of the gulf of Hucus.

GINDELH, in Geography, a town of Candahar, on the Behut; 48 miles E.S.E. of Cabul.

GINERE, a town of Ceylon; five miles N of Point de Galle.

GINERCA, a town of the island of Corica, 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 Aude, and chief place of a canton, in the district of Narbonne: seven miles N.W. of Narbonne. The place contains 551, and the canton 6753 inhabitants, on a territory of 1674 kilometres, in 15 communes.

GINETO, a town of Naples, in Calabria Citta; 16 miles N.W. of Rigiana.

GINETTA, GENETTA, OF GENET, in Zoology, the Viverra genetta of Linnaeus, which see.
GINGEE, in Geography, a town and fortress of Hindoostan, in the Carnatic, once the capital of a kingdom of the same name, situated on a mountain and defended by three castles; 33 geographical miles from Pondicherry and 23 from Trincomalee. N. lat. 12° 16'. E. long. 79° 36'.

GINGER, in Botany. See Amomum.

GINGER, 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, cleaned, 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 10 lbs. 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, crushed, separately washed, and afterwards dried with great care; by this operation more than double expence is incurred, and the market price is proportionally greater. Black ginger is paid by Jacobin to lose part of its essential oil by being thus immersed in boiling water; and on this account it is less useful for medical and other purposes than the white, which is always good when perfectly found and free from worm-holes; but that imported from the East Indies is stronger than any we have from Jamaica. This warm aromatic root appears, says Lewis, to be much less liable to lose the conititution than might be expected from the penetrating heat and pungency of its tafle, 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, tinged 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 confection, dissolved elsewhere 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 smell. It is used medi cally as an antispasmodic and carminative. The cases in which it is more immediately serviceable are flatulent colics, debility and laxity of the stomatch and intestines, and in torpid and phlegmatic constitutions to excite bitter vascutar 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 prescribed as a condiment, and as a subsidiary ingredient in many compositions. The syrup of ginger is prepared by macerating two ounces of the ginger root in a pint of boiling water for twenty-four hours, and then straining, and adding two pounds of refined sugar, as in other syrups. The tincture of ginger is formed by macerating two ounces of ginger root in two pints of proof spirit for 14 days, and then straining the liquor. The dietetic qualities and ufe 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 disfop 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 ufe of this confection, as holding it sovereign against the scurvy. The Indians eat the root, when green, by way of salad, first chopping it small, mixing it with other herbs, and seafoning 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, straining 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, cuminning it as it rises; let it by till the next day in a glazed pan; then boil it for half an hour, and repeat this boiling at the fame interval till the ginger is cleare. Put it into glaffes, and cover them with paper, and it will affure a fine sweetmeat for the winter. A wine is made of ginger, which is a pleasant and fabulous beverage.

GINGER, in Geography, one of the smaller Virgin isles in the West Indies; 10 miles S. W. of Virgin Gorda. N. lat. 18° 21'. W. long. 62° 53'.—Alto, a town of Egypt, on the E. branch of the Nile, opposite to Naufiah.

GINGEBREAD, a richer kind of bread; the flavour and tafle of which are heightened and improved with spices, and particularly ginger; whence the name.

There are various forms and preparations of gingerbread; we shall contain 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, scraped fine; and liquorice, and anniseed in powder, of each a quarter of an ounce; pour in two or three spoonfuls of rum-water, and make the whole into a paste, with half a pound of sugar: mould and roll it, print it, and dry it in a flaye. 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 paste.

GINGERO, or LENDEREO, in Geography, a kingdom of Africa, situated on the S.W. of Abyssinia. N. lat. 6°. E. long. 35°.

GINGHAM, a town on the north coast of Sumatra. N. lat. 5° 10'. E. long. 96° 10'.

GINGIDIUM, in Botany, a name adopted by Forster, Nov. Gen. t. 21, for an unbelliferous plant, found on the hills of New Zealand, which he himself suspected to be a Lignium, and which has been so confirmed by following botanists. It is Lignium Gintidiun of Willd. Sp. Fil. t. 1. 1428. See LIGNICUM.

The 515560 a of Dioecorides appears to be likewise of this natural order, but the species can scarcely be determined with certainty. Dr. Sibthorp supposed it might be Daucus Gintidiun of Linney, merely from the coincidence of the name, for it agrees better with D. Vifhago, Annu Vifhago, Prod. Fl. Græc. n. 650; not that any thing can be gathered, from the description of Dioecorides, to quote him, in such a case, with any propriety. He says it is " by some called Lepidium, and grows very abundantly in Cilicia (now Carna-ma) and Syria. It is a little herb, like wild carrot, but more tender and more bitter, with a whitish and bitterish root." This will be found to accord equally well with many plants of those countries. Matthiolius, milled, as it seems, either by a Latin version, or by the opinion of those who take the cæcum of Dioecorides for the Podinae, or Partlip, whereas it is evidently by the description a Daucus, or Carrot, took for the 515560 a Syrian plant, first decribed by himself, and which indeed is smaller and tenderer than the Partlip, though larger and broader than the Carrot. Hence he conjectures those who have taken the Cervil, Scandius Coriandrum, for the herb in question, though they really appear to be more in the right than himself. However this may be, the plant of Matthiolius is the Daucus Gintidiun of Linney, as well as his D. icaria.
GINGHEIM, in Geography, a town of Germany, in the county of Hamn Munzenberg; 11 miles W. of Hamn.

GIN-HOA, a town of China, of the third rank, in Quang-tong; 22 miles N. of Chao-tehun.

GIN-HOA1, a town of China, of the third rank, in So-tehun; 32 miles S. of Tcheli-ison.

GIN-PALIAGARUM, a town of Hindoosan; 25 miles E. of Calcut.

GINKO, in Botany, Linn. Mant. 313. Komp. Ameon. 814. t. 813.—The Japanese name of a tree, as large as a Walnut-tree, with leaves resembling an Aclanum. The male flowers are in catkins, the female solitary, on flanks, producing a drupa, whose nut resembles that of a Pigeon, with a white, somewhat allistening, 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 Linneus, 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. Salisbury having with great affility determined its essential characters, it was dedicated to him, by Dr. Smith in the Trans. of the Linn. Soc. v. 3. 359, and his botanical merits will ever justify the approbation. See SALISBURY.

GIN-KIA-CENTZE, in Geography, a town of Chinese Tartary. N. lat. 41.45. E. long. 123.29.

GIN-KIEOU, a town of China, of the third rank, in Pei-tchii; 17 miles N. of Ho-kien.

GINLIA, a town of Naples, in Abruzzo Ultra; 12 miles N. E. of Teramo.

GINNANI, Francis, in Biography, was born at Ravenna 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 Farneze. 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 Ginnani, 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 Pavia, 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 obsequious to the duties of religion. He died at the age of forty. His principal work was a treatise on the diamonds of corn, with observations on the culms and seeds. He published an account of the natural productions in the museum of Ravenna, and he greatly interested himself in the instruction of the society of that town. He left behind him some manuscripts, among which was a "Natural and Civil History of the Fine Forests of Ravenna." Gin. Bibl.

GINNIS, in Geography, a town of Turckish Armenia; 21 miles W. N. W. of Erzerum.

GINNISI, a town of Hindoostan, in Guzerat; 36 miles S. of Amrabad.

GINONDAYAN, a town on the E. coast of the island of Levitt. N. lat. 10° 27'. E. long. 125° 10.

GINORIA, in Anatomy, a name given to a small kind of dye-fust for beginners.

GINOSO, GINOSUL, or GINIP, in Geography, a town of Toulkis; 10 miles W. of Angle.

GINGRA, in Antiquity, a kind of dance used at funer.

GINGRAS, or GINROS, in the Ancient Mea., a dance performed to the sound of Putes.

GINRINA, in Antiquity, a name given to a small kind of dye-fust for beginners.

GINGER, or GINGROS, and Gingrnis. Medical Uses of the Zinnata. The Phœnicians, according to Pliny, had stores of only a palm in length, which produced acute, but pleasant scents. The Carians made use of them in their perfumes; perhaps the Carians the Phœnicians are meant here, as in Carina and Bathlydes. These flowers derive their names from the incumbrations of the Phœnicans at the death of Adam, whom they called Gingr. Encycl. Suppl.

Linnœus having in the first instance defined it from the wooden cut of Matthiolus, and in the latter described it from a speci"
JufT. then flowers they one barrier part the branches much tube the Perk. the but put F. Nat. Sc.Js-thefe it upon found Martinius, the natives Germen central populace.

"Gin'-Seng," bore GIN- SENG, been introduced into gardens of Europe, nor have we even a dried specimen.

"Gin-Pin," in Geography, a town of China, of the third rank, in Chau-tung; 17 miles N. E. of Tong-chang.

"Gin-Seng," or Nin-seng, in Botany. See Pinax. "Gin-Seng," 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, expressing only spirit, or the pure spirit of the earth; the plant that gives immortality, &c. It makes, in effect, the whole materia medica for the people of condition, but is too precious for the popular use.

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. Tachard, in his Voyages; and F. Le Comte, in his Memoirs.

And yet we knew but very little of this plant before F. Jartoux, a Jesuit, and missionary in China; who, being employed, by order of the emperor, in making a map of Tartary, in the year 1769, had an opportunity of seeing it growing in a village about four leagues from the kingdom of Corea, inhabited by Tartars, called Caliu-Tatze.

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 twice the thickness of the item, and which grows tapering to the end; at a few inches from the head it frequently 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 enquired of, could ever find, that at more resemblance to the figure of a man than is ordi-
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 perons, 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 ran over the whole face 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 subsistence 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 close woods, but it has now been long known that this plant is also a native of North America, whence M. Saratian transmitted specimens of it to Paris in the year 1704; and the gin-feng since discovered in Canada, Pennsylvania, and Virginia, by La Fonte, Kalm, Bartram, and others, has been found to correspond exactly with the Tartar 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 somewhat different appearance. This plant was first introduced into England in 1740 by that industrious 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 horny texture, and both internally and externally of a yellowish white colour. To the taste, says Lewis (Med. Bot.), 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 fenugreek, to which it has by some been supposed similar; and differs likewise remarkably from those roots, in the nature and pharmacetical properties of its active principles: the sweet matter of the gin-feng being procured entire in the waterys as well as the spirosus extract, whereas that of fenugreek is destroyed or dissipated in the infusion of the watery tincture. The flight aromatic impregnation of the gin-feng is likewise in good measure retained in the watery extract, and perfectly in the spirosus.

The gin-feng, we have observed, is an ingredient in most of the medicines which the Chinese physicians prescribe to the better fort of patients; they affirm, that it is a sovereign remedy for all weaknesses occasioned by excessive fatigues, either of body or mind; that it attenuates and carries off pitious humours; cures weaknesses of the lungs and the pleurisy; stops vomitings; strengthens the stomach, and helps the appetite; diffuses 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 dizziness of the head and dizziness; 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 con-stantly produce a good effect; those that are in health often make use of it to render themselves more vigo-rous 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 quantiy, according to the nature of the disease 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 invigorate 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 languid and weak, 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 fatigued of any weariness. I have often made use of it since, and always with the fame 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 I always find myself as well afterwards, that I should readily prefer them before the best 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 virtue, 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 glued, with about half a pint of water; the pot is to be well covered, and set 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 spirits part of the root.

These two doses are to be taken, the one in the morning, and the other in the evening. Phil. Trans. N 337, or Alberici, vol. iv. part ii. p. 412, &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. Bot. v. ii. p. 261. Highly 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. Wodville (Med. Bot.), of its efficacy in Europe, and from its sensible qualities, we judge it to supply very little power as a medicine. It is recommended in debility, vae, a drachm 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 Shapiska.

Gio, St., a town of Italy, in Friuli; 11 miles W. of Palma la Nova.

Gio di Fiore, St., a town of Italy, in Calabria Cit; 16 miles W.S.W. of Umbratrico.

Gio in Pelagio, St., an island in the gulf of Venice, near the coast of Ifria. N. lat. 45° 15'. E. long. 13° 49'.

GIOAR, in the Materia Medica of the ancient Arabs, a word
GIOBAR, in Geography, a town of Asiatic Turkey, in the province of Diarbekir; 20 miles N.W. of Fezit.

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 chosen 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 monuments and manuscripts. He presented to Lorenzo de Medici a collection of ancient inscriptions which he had compiled in Rome. Giocondo was sometime 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 Architect-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 editing many other works of the ancients, and was the first person who gave a definition of Caesar's bridge over the Rhine. In 1526 he wrote four dissertations, addressed to the magistracy 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. Biog.

GIOFAR, AL, in Geography, a town of Arabia; 8 miles S. S. E. of Rabigh.

GIOGL, a town of Transylvania, situated near the Maros; 14 miles S. W. of Millenbach.

GIOJA, or GIOVA, FLAVIO, in Biography, was born at Pastrano, near Amalfi, in the kingdom of Naples, about the year 1300. 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 diposes 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. Morei. See the article Compass.

GIOLI, in Geography, a town of Naples, in the province of Cari; 14 miles S. S. W. of Converano.—Allo, a town of Naples, in Abruzzo Ultra; 7 miles S. E. of Celano.—Allo, a town of Naples, in Calabria Ultra; 7 miles S. of Nicotera. GIOMELU, a body of the phallic, or koros, in the service of the grand signor.

GIONI PIANO, St. in Geography, a town of Naples, in Capitanata; 8 miles S. S. W. of Latera.

GIOBRASH, a town of Arabia, in Yemen; 60 miles N.W. of Sado.

GIORDANI, VITAL, in Biography, was born at Bitonto, a town belonging to the kingdom of Naples, in 1633. 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 sought for safety by leaving his country. He entered as a common soldier on board the jolly, with which pope Innocent X. went 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 purveyor, 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 Christina, 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 of Wisdom. By his great prudence, regularity, and temperance, he redeemed his character, and died in his 78th year. His principal works are "Euclide Refituto," 1666, folio. "Fundamentum Doctrinarum Gravium," and "Ad Hymnorum Christianorum Epistoliarum." Morei.

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 to incessantly Luca in præfio, (Luca make chief,) that in præfio became his nick-name among his companions.

His first matter of any note was Joseph de Ribera, called Spignolette; to whose style he, for a time, so much adhered, as to puzzle the most discerning critics. From Naples he removed to Rome, where he indifferently finished the noble remains of antiquity, and the works of eminent masters in the art. He fixed himself unhappily with Pietro Cortona, by which it is probable his brilliant imagination was taught to expand itself in a more imperfect 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 brought on many noble works in fresco; and was so incredibly expedient in that art, that he could dispatch as much as twenty paintings 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 consequent abundance of his
his productions, soon spread his fame over Europe. The king of Spain (Charles II.) desiring to see him paint, and to have the Escorial adorned by his hand, invited him there, ordering 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 denying with his attendance, that he might be more his own master.

Velazquez says, "that it is impossible to express the number and beauty of his compositions in Madrid, Toledo, and at the Escorial; and that he employed only two years to paint ten arched cedings of the church and shrine of that palace. He was exceedingly industrious, generally painting six or seven hours every day, and being highly favoured by the King, became exceedingly rich. It was in 1692 he first arrived at Madrid, and did not return to Italy till 1702, when he accompanied Philip V. to Naples, and in 1704 died there.

Previously to his going into Spain he had executed numerous 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 facility of his genius. The extraordinary facility of painting which he possessed, enabled him to work with great success in sfresco, as well as in oil. This very facility is, however, the cause that Giordano's works will never be regarded 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 freshness and cleanliness of colour and effect produced by it, is unwilling to disturb it in order to render the parts more positively correct; and thus, though ever agreeable, yet works wrought in this manner are too often finny and weak in their effect on the mind. This is the character 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 Ascension at Naples, representing the fall of Lucifer. And in the Durazzo Palace at Genoa, is a fine picture of Seneca dying in the Bath; of which, also, there is a duplicate in the gallery at Dresden.

GIOGIEV, in Geography, a town of Walachia, on the N. side of the Danube; 40 miles S.W. of Bucharest. In June 1771, the Russians defeated the Turks near this town, killing 5000 of them, and taking 180 pieces of cannon, with artillery and baggage, for 50,000 men. N. lat. 43° 38'. E. long. 25° 18'.

GIOGIO ANTONIOTTO, in Biography, an Italian writer on music, who, having been a considerable time in England, had a work entitled "L'Arte Armonica," translated into English, which he published in two vols. folio, by subcription, under the title of "A Treatise on the Composition 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 Antonio, and translated into English, 1760, printed by Johndon, Cheapside.

We had at this time no well digested, clear, and ample treatise of composition in our language. Morley's treatise became scarce, obsolesce, and totally defective in every thing that concerns modern music. We had indeed Malcolm's treatise published in 1721, and that of Dr. Pepusch in 1731. The first is dark and awkwardly written; the second, though excellent as far as it goes, has some prejudices of the old school, which were totally abandoned in 1760, 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 1751 had no existence. Ceminini's "Guida Armonica," to long expected, and published about the year 1746, puzzled the cause, and disappointed every reader. Much therefore was expected, even by professors, from a work in two vols. folio, written by a learned Italian, and nearly half the list of subscribers consisted of the names of the principal composers and organists of the time.

We had a miserable translation of Rameau's treatise, written originally in a musical technica, totally different from that to which we were accustomed, which, with the ungrammatical and bad English into which the rest was translated, threw 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 Ceminini, for those who took the trouble to score them, were excellent lessons of counterpoint, if they had been properly studied. But it is astonishing how long even great performers upon instruments remain in utter ignorance of composition. Jack James, Magnus, and Kilway, though admirable organists, never attempted composition, and if they had, after a certain time, they would never have been sure of their ground, but even in making a bafe to a minuet or country dance would have discovered to real judges, that they were not regular bred contrapuntists.

Signor Antoniotto, 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 master. His introduction, and historical account of the progress of music from the yew of the Greeks to the present time, will amuse, though not accurately instruct, curious readers.

He enquires to Guido the invention of harmony, and to John de Muris the invention of musical characters, as had been long done by others who, confusing with 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 Magnifery Franco, who flourished 1547, near 300 years before John de Muris was born. (See Franco and De Muris.) So much for fig. Antoniotto's historical part.

When he comes to practical music, his definition 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 no scientific an appearance as to frighten a principiante as much as teaching geometry or algebra would do. His examples of notation are methodically stated; but the joining the old and modern characters in the same table will confound the student's ideas. He begins with three characters no longer in use, and the semibreve, now the first and longest note, ranks only as the fourth."

His general scale and fylom of intervals will terrify a young student by the manner in which it is represented; its fylom of harmonic combinations the same. Plastos 14 and 15 of transposed scales are clear and useful, as are the fylom in the feveral keys.

The rôge de foncave seems unknown to the author, and his plain counterpoint is written entirely on a series of sevenths to bases rising or falling by fourths and fifths totally without modulation. No instructions are given for the use of discord, but in examples du duo di lui gives discords indiscriminately to every note, without informing the student when and where to use them, or speaking of accented or unaccented parts of a bar.
GI O

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. An 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 rhythm.

At p. 49, ex. vii. there are observations in abundance between the second and third lines, unnoticed by the author.

Page 169, vol. i., the author very judiciously confines vocal fugues and canons, in which the several voices are singing different words and syllables at the same time; but Rouland had done this before, in his "Lettre sur la Musique 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 pallsages 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, famneed del Grasso.

He was of Parma, and, as we believe Orlandi, not merely one of Correggio's school, but a pupil, whose works the master himself retouched. The principal picture in St. Michael, erroneously ascribed to Leoli Orlo, is claimed for him by P.-Zapata; a performance, though in parts capriciously conceived, of an impasto, a relief, a sweetness of colour and pencil, to confer honour on the bell of that school. The effect in which he was held by his fellow-citizens may be conceived, from the commendation 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 commision fell to a third to Girolamo Mazzutti, though not yet ripe for an enterprise of such magnitude. Fuseli's Pillington.

GIORIO, St. in Geography, a town of Naples, in Calabria Ultra; 17 miles S.E. of Nicotera.—Alfo, a town of the island of Liparia; 44 miles E. of Liparia.—Alfo, a town of France, in the department of the Po; 31 miles N.W. of Chivasso.—Alfo, a town of Naples, in the province of Otranto; 4 miles E. of Taranto.—Alfo, a town of Naples, in the same province; three miles N.N.W. of Nardo.—Alfo, a town of Naples, in the province of Prin- ciupato Ultra; 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 Bol- logna.

GIORGIO, a town of Africa, in the country of Mogambique, 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 14th century. His father was a labourer, who lived at Vespignano, near Florence, and whose name was Bondoni; but he gave the name of Giotto to his son, who was born in 1266, and whom, at an early age, he placed with some shepherds to affix in tending their flocks. Whilst engaged in this employment, he was found by Cimabue drawing a sheep in the field with so much ingenuity, that that painter was induced to adopt 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 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 mother, and arrived at a degree of art which, in grace at least, was not excelled before Maffiaccio. M. Fufi, in his last edition of Pilkington's Dictionary, observs, that "it is not easy to account for the rapidity of his progrs, unless we ascribe it to the study of the antique, with which he might have become acquainted at Florence, and afterwards at Rome; and as we know that he was likewise a sculptor, and that models of his existed at the time of Lorenzo Ghir- 
berti; this conjecture becomes highly probable, when we consider the character of his heads, the irregularity of his forms, the broad and majestic folds of his draperies, with the grave and decorous attitudes of his figures." Being contemporary with Dante, it is to him we owe the portrait of that illustrious poet, and also those of many other personages of that period famed for their birth and talents. The great work now remaining, though in a ruined state, which tellifies most fully the full ground on which he earned the fame he receives, is at Altilh, in the church of St. Franc-
cisco, where, in 32 pictures, he has represented the various actions of that faint in the course of his life. These, together with many others, have remained in the same place, are in fresco, and have ever been esteemed of suprme excellence for expression and beauty of composition, and for the grace and truth of actions, and proportions of the figures. His fame reached the ears of pope Benedict IX. who sent for him to Rome, and employed him in the Vatican, and in St. Peter's. Clement V. took him to Aigignon, where, and in other places in France, he painted many pictures in fresco, and thence drew great riches; returning to Florence in 1316. He afterwards painted in most of the principal cities of Italy, but more particularly at Florence, where his works were studied by succeeding artists, and highly ap-
plauded even by Michael Angelo Buonarroti. He died in 1336, aged 60, having enjoyed a life of fame and esteem; and honoured by admittance to the citizenship of Florence, as a reward for the honour his great talents conferred upon his country.

GIOVANII, in Geography, a town of Peria, in the pro-
vince of Kerman; 57 miles E. of Sirjan.—Alfo, a town of Peria, in the province of Farilfan; 10 miles N. of Schiras.—Alfo, a town of Peria, in the province of Segelitan; 55 miles W.N.W. of Zaren. GIOVANA, a town of the republic of Lucca; seven miles N. of Lucca. N. lat. 44° E. long. 10° 40'.

GIOVANNI ASSASSI, in Biography, a celebrated Ita-
lian 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, we say, he heard him at Hamburgh, and in 1773 he went to Amster-
dam, where, as well as at Hamburgh, 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 Agajari. In 1777 at Naples with Rubiniel. In 1779 he arrived in England, where he found Roncaglia, whose bounded abilities excited an ambition in the tenor singer to take the pas 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 volubility. Nor could any defect be justly ascribed to it, except perhaps a little want of variety, spirit, and anima-

GIOVANNI, St. in Geography, a town of Naples, in the cap-
itanata; six miles N. E. of Accli.—Alfo, a town of the duchy of Carinola; two miles N. W. of Duino.—Alfo, a town of Italy; 19 miles N. of Bergamo.—Alfo, a town of Filria; nine miles N. E. of Pula.—Alfo, a town of Naples, in Abruzzo Utra; 13 miles S. of Celano.—Alfo, a town of Naples, in Ballisicata; 17 miles S. W. of Materia.—Alfo, a town of Italy, in the ducry of Piacenza; six miles W. of Piacenza.—Alfo, a town of Etruria; 18 miles S. E. of Florence.

GIOVANNI, St. or St. John, an island in the Mediterra-
near. N. lat. 36° 27'. E. long. 26° 24'.

GIOVANNI Katanla, St. a town of Naples, in Capitanata; 10 miles N. W. of Manfredonia.

GIOVAR, a town of Peria, in the province of Farilfan; 55 miles S.S.W. of Schiras.

GIOVELLINO, a town of Cortica; 25 miles E. of Corte.

GIOVENAZZO, a town of Naples, in the province of Barl, situated near the sea, the fee of a bishop; con-
taining four churches, four convents, and defended by a castle; eight miles W. of Barl. N. lat. 41° 17'. E. long. 16° 42'.

GIOVI, a town of Etruria, on the Chieno; five miles N. of Arezzo.

GIPPINI, a river of England, in Suffolk, which joins the Orwell, and falls with it into the Stour.

GIPSIES. See EGYPTIANS; under which article the reader will find an account of their supposed origin, migra-

Schedini, with whom Anfani contrived to quarrel, took

attacks, and from the tenor singer's pride, impatience, and irreconcilable dis-

putions, he was in a perpetual warfare during the two

years he remained in this country.

His figure and countenance on the stage were good; he

was tall, thin, and had the look of a person of high rank.

He told us, we believe with great truth, that he was

famous in Greece, always in vogue. He was husband to the

Machecchi, who came hither as first woman of the famous

opera, without a voice. If ever she had a voice, he had

lost it before her arrival in this country. We never could

receive any pleasure from her performance; every note,

feebly as it was, was the squeezed out with such difficulty, and

with a look so croft and miserable, that after her first ex-

hibition we never wished more either to hear or see the

Signora Machecchi, who was so proper a match for her

husband in sweetness of disposition, that in Italy, when

employed in the fame theatre, if one happened to be ap-

plauded more than the other, they have been known mutu-

ally to employ pertons to lift the失败ed rival. The

Machecchi is laid to have been once a very agreeable singer,

and a considerable favourite on the continent during her

bloom; but soon after her first appearance she ran away

with an English nobleman, from the theatre in Florence, in

her stage drees during the middle of the performance.

GIOVANII DA SAN GIOVANNI, a painter whose real

name was Gio. Manuzzo. He was one of the best Italian

artists in fresco. Poffessing a vivid imagination and a ready

hand, his works are numerous, and adorn many of the

churches and palaces of Rome and Florence. He did not

begin to paint till he was 18 years old, his success is there-

fore the more extraordinary. The genius he was endowed

with being of an irregular nature, he frequently took great

liberties in his designs; but his fresco-paintings at Florence

shewed how well, when he pleased, he could restrain the

improper exuberancies of his imagination. He died in 1656,

aged 46.
tions, and character, and of the treatment they have undergone in several countries in which they have appeared. We shall here add, that Muratori, in his "Antichita Italiane," fuggites, that it was not before the year 1430 that this singular race of people, like from the king's bounty, pretended that Egypt was their native country, and that they were deprived of their settlements by a king of Hungary. Nothwithstanding the geographical absurdity of this alteration, it was readily credited by the ignorant vulgar. It appears probable, according to this writer, that they drew their origin from Wallachia, or the neighbouring countries, as they are still found in great numbers in Hungary, Servia, Bulgaria, and Macedonia. Whether they were expelled from their native dens, or left them spontaneously, and we may add, whatever was the country from which they migrated, it is certain that about this period they began to appear in the western provinces, and by their fraudulent arts were able to gain a footing there, though by nature ever addicted to a vagabond life. They were neither cultivators of the soil, nor artisans, but found an inexhaustible supply of their necessities in theft, rapine, and deceit. Although their mode of life was not unknown to the Italians, their infamous practices were tolerated, because they made the simple people believe, that a penance was imposed upon them of wandering about for seven years; and still more, because they pretended to the gift of divination and foretelling future events. An opinion long prevailed, that they were forbidden to remain longer than three days in one place, and that they had a privilege from the pope of providing themselves with necessary food wherever they should be. The time in which the "Zingari," or "Zingari," as they were called, first made their appearance in Italy, may be collected from the "Mecella Bolognese," published in the 18th volume of the "Recueil Italienarum." Hence we learn, "that on July the 18th, 1432, there came to Bologna a duke of Egypt, named duke Andrew, together with men, women, and children of his country, in number about 100. They had a decree from the king of Hungary, who was emperor, authorizing them to rob wherever they should go for the space of seven years, without being amenable to justice. When they arrived at Bologna, they lodged within and without the Porta di Galliera, and kept under porticoes, except the duke, who was lodged at the king's hotel. They were in Bologna 25 days. During that time many persons visited them, on account of the duke's wife, who understood divination, and could tell what was to be a person's fortune, what was his present condition, how many children he was to have, if a woman was good or bad, and the like. In many things they spoke the truth; and when people went to have their fortunes told, few escaped without having their pockets picked, or, if women, their clothes stripped of their ornaments. Their women went, by six or eight together, through the city, entering the houses of the citizens and praying with them, at the same time telling what they could lay their hands on. They also went into the shops, pretending to buy something, whilst some of the party were employed in pilfering." Italy did not suffice for this crew, which was gradually augmented by accessions from the men and women of the countries through which they passed. Krantz, in his history of Saxony, writes, that they began to be seen in that country in the year 1417, and he gives a lively description of their customs and cheats, under the name of "Zigeni," or "Zigeuni." Aventine also mentions their arrival in Bavaria, and their mal-practices in 1411. They spread in like manner through Flanders and France, in which country they were called "Egyptians" and "Bohemians," and in Spain they were named "Cattanesi." They are also found in the Turkish dominions. Although they have been frequently banished from various districts, and severe edicts have been issued against them, they still continue to keep up the race, and carry on their trade of petty pillage and deception.

GIR, or Ginn, in Geography, a river of Africa, which Ptolemy delineates as equal in length to the Nigir, the course of each being probably about 1000 British miles; but running from east to west, till it be lost in the same lake, marly, or desert, as the Nigir, which see. The Arabian geographer Edrisi seems to indicate the Gir, when he speaks of the Nile of the Negroes, as running to the west, and lost in an inland sea, in which was the island Ull. Some have supposed the Gir of Ptolemy to be the river of Arnon, or Uper-al-Gazel, which joining another considerable river, flowing from Kuku, discharges itself into the Nubia Palus, or Kranga, and it is so delineated in Renault's map; but others apprehend, somewhat better reason, that the Gir of Ptolemy is the Behr Kulla of Browne, in his history of Africa. This river, the Niles Nigurum, as well as the Nile of Egypt, have their source in the mountains of Kemri, which Browne lays down in the 8. S.E., as to correspond with the Beir Kolla, though he be a stranger to its remote source. This river represents the Nile as receiving two tributary streams from two lakes; and among other cities on its bank is a metropolis called Gira. The termination of the Gir is not a little obscure, but it seems to be delineated, as falling under a chain of hills, on the N. of the Lybia Palus, on central lake of Africa, and afterwards joining the Niger in its course to the west. The Pamiers of Ptolemy, between the Gir and the Nigir, may be the Wangara of the Arabs, and his Lybia Palus, which forms the termination of the Nigir, as Rennell observes, either for the largest of the lakes, or for the lakes of the country (of which there are several) collectively. From an accurate examination of Edrisi, who wrote in Sicily in the 12th century, and who, from his minute attention to central Africa, has been called the Nilotic geographer, it will appear, that while the Nile of the Negroes, which he says runs to the west, has been mistaken for the Nigir, he really knew nothing of that river; and his Nile of the Negroes is the Gir of Ptolemy, terminating in an island lake, in which was the island of Ull, one day's sail from the mouth of the river; and in which island another Arabian geographer places the capital city of all Sudan. Beyond this lake and island, Edrisi appears to have had no knowledge of central Africa; all the regions and towns he mentions forming part to the Gir, his Nile of the Negroes, running to the N.W.; and from his account it would appear that Wangara is the Delan of the Gir.

Gir, in Botany, a species of grass growing plentifully near Rais el Fedd, on the borders of Algyeria. It is said, says Mr. Bruce, to flourish in the end of April, and specially advanced to its full height of about three feet four inches. It is ripe in the beginning of May, and stays green for some afterwards. This species of grass 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 feed of it...
GIR

produced a plant any where but in the garden of the late French king.

GIRA, in Geography, a town of Peria, in the province of Mazanderan; 18 miles S. of Sari.

GIRA, in Antiqu Geography, a metropolis of Libya interior, seated on the river G. Ptol. See GIR.

GIRAFFE, in Zoology. See Camelopardalis.

GIRAGLIA, in Geography, a small island near the N. coast of Corsica; 23 miles N. of Baffia. N. lat. 43° 1'. E long. 9° 35'.

GIRALDI, GIOVANNI GREGORIO, in Biography, one of the most learned men of his time, was born at Ferrara in the year 1493. He pursued his studies at his native place, and having attained considerable eminence in the languages, he was chosen by the countess Rangone as preceptor to her son Herder, afterwards a cardinal. He accompanied the court 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 other young persons in polite literature, and continued at Rome during the next two pontificates. He enjoyed but a slender portion of health, and at the age of Rome he lost all his property, and even his books. This was in the year 1527, when, having left his friend and patron the cardinal Rangone, he was obliged to leave the capital. In his distress, which was very great, he went to Bologna, and thence to Mirandola, where he met with a very kind friend in Gian-francesco Pico. This patron was murdered in 1533, 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 1532. 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 Dis Gentium." This is the first treatise in which mythology is discussed in a truly learned manner, and it is a treatise which exhibits the vast 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 theMuses;'' "The life of Hercules;'' "Explanations of the Pythorical Symbols;'' and other ancient enigmas; "A Treatise of Years and Months, with Greek and Latin Calendars, and thirty Dialogues on subjects of Eрудition." He gave "A History of the Greek and Latin Poets, and of the Poets of his own Time." He was a considerate Latin poet, and it is thought a feeble of his own misfortunes induced him to write two small pieces against ingratitude, entitled "Prognosticata adversus litteras et litteratos." Morevi.

GIRALDUS, SILVESTER, CAMBRENSIS, 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 preferred, printed and manuscript, we shall here only advert to an extraordinary paflage relative to music, in his "Cambrice Descriptio, cap. XIII." which has been lately quoted by musical writers, and on which great stress has been laid by Eximeno (Dobbio sopra il faggio fond. prat. di contrap. di P. Martini) and by Mr. Ed. Jones, Mus. Relics of the Welsh Bards.

After all the enquiries that we have made concerning the origin and antiquity of counterpart, or music in parts, the passage to which we allude surprised 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 fingers into Kent, to finish the work which Aulin, the first Roman millinary, had begun. In 682, according to Bede, John, the precentor 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 schools 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 Cambrensis gives of the peculiar manner of finging that was practised by the Welsh, and the inhabitants of the north of England, about the end of the twelfth century.

"The Britons," says he, "do not finge in uniform, like the inhabitants of other countries; but in many different parts. So that when a company of fingers among the common people meets to finge, it is usual in this country, as many different parts are heard as there are performers, who all at length unite in consonance, with sweet finges. 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 finge in two parts, the one murmuring in the base, and the other warbling in the acute or treble. Nor do these two nations practise this kind of finge so much by art as hobby, which has rendered it so natural to them, that neither in Wales, where they finge in many parts, nor in the north of England, where they finge in two parts, is a simple melody ever finge. And, what is still more wonderful, their children, as soon as they attempt using their voices, finge in the same manner. But as not all the English finge 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 Cambrensis is indeed an author who has been often supposed 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 practice of finging in parts, can have no exalted idea of the harmony of an untutored crowd, turba canentium, or suppose it to be much better than the deficient parts 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 have all these united at last in the consonance of organic melody, and the soft sweet fings of B mollis, will long remain an impenetrable secret:

"As true to no meaning puzzles more than wit."

With respect to what he affers of the people in Northumberland finging 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 maiters, who may probably have first brought over the art of finge, or double finge, which the newly invented organ had suggested, by the facility it afforded of sounding two or more notes at a time; which art, when practised by voices, was thence called organum, organae. But as to what Giraldus fays of children naturally finging 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 Arissa; 45 miles S.E. of Oran.

GIRANA, a town of Abyssinia; 60 miles N.W. of Gondar. N. lat. 13°. E. long. 36° 37'.

GIRANDOLE, a large kind of branched candlestick. See Branch and J E N E.

GIRAPATRA, in Geography, a town of the island of Ceylon; 16 miles S.W. of Settin.

GIRAR, a fortress of Hindooftan, in Malwa; 40 miles S.W. of Chandercer. N. lat. 24°. E. long. 79° 18'.

GIRARD, Gabriel, in Biographia, a distinguished member of the French academy, known as the author of a work entitled "Synonymes Françoisi," 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 indifferently. No grammatical work was ever better received by the public, and it was the opinion of Voltaire that it will subist as long as the language. This work has been imitated in English, in one entitled "The difference between words efeemned 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 "Principes de la Langue Françoife," which has much merit in its plan and theory, but is thought very defective in point of style.

GIRARDO, Francis, an eminent sculptor, intended by his father, who was a founder, for the profecution 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 patronized by Le Brun. Girardon is reckoned to have had more correctness 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 baths of Apollo, and the rape of Proserpine in the gardens of Verailles; the equestrian statue of Louis XIV, and the mausoleum of cardinal 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. Moreau.

GIBE', in Geography, a town of Egypt, on the right bank of the Nile; 26 miles N. of Syene.

GIBEH, 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 Pullhely, Caernarvonshire.

GIRCHSBECK, a town of the duky of Hohlenstein, six miles W.S.W. of Oldenfohe.

GIRCZENI, a town of Moldavia; 30 miles N.E. of Galatz.

GIRDERS, or GIRDING beams, in Carpentry, are those large beams thrown across a room, in order to threnit the bearing of the joists.

When the bearing is not very great, the girder confids of a single beam; when it is more than common, the baulk, 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 bearings the girder is framed like the principals of a roof, for the construction of which we refer the reader to the article Carpenter, 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 same heart of wood, and as free of knots as possible, for knots destroy the continuity of the fibres, and consequently impair the strength.

GIRDING-GIRT, in Sea Language. The freeman 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 tides.

GIRDLE, CINQUELS, or ZUZ, 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 surrender 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 succession 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. x. 9. Haggai, i. 6. Horace says, that he who has lost his girdle (his money) is ready for any thing. "Itb e quod vis, qui zonam perdidit." Hor. Ep. I. n. c. 1. The Romans always wore a girdle to tuck up the tunics, 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, Maidens' or Virgins'. It was the custom among the Greeks and Romans for the husband to entie his wife's girdle. Homer, lib. x. of his Odyssey, calls the girdle της φίλου ζώνη, maid's girdle. Felix Fabius, that it was made of sheep's wool, and that the husband untied it in bed; he adds, that it was tied in the Herculanean knot; and that the husband untied it, as a happy preface of his having as many children as Hercules, who, at his death, left seventy behind him.

The poets attribute to Venus a particular kind of girdle, called πλατύ, to which they annexed a faculty of inspiring the passion of love.

GIRDLE, Quicksilver, in Medicine, 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 these 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 at Paris every three years, at the rate of three deniers upon each muid of wine, and fixed for each queue; it was intended for the maintenance of the queen's household; afterwards they augmented and extended it to other commodities, as coals, &c.

Vignere supposes 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 Persia, and under the same name, above two thousand years ago; as appears from Plato, in his Alcibiades, Cicero, Athen. &c.

GIRDLE,
GIRDLENESS, in Geography, a cape on the E. coast of Scotland. N. lat. 57° 4'; W. long. 2° 2'.

GIRELLI, Agnese, in Biographia; a female opera singer, who arrived here the same season as Miller, in 1772. Her style of singing was good, but her voice was in decay, and her intonation frequently failed; when 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 Mrs Cecilia Davies.

GIREST, in Geography, a town of Perseia, in Kerman; 100 miles E. N. E. of Gonron.

GIRET, a town of Persia, in Mazanderan; 30 miles S. of Febrashab.

GIRGASHITES, in Scripture Geography. See CALSHITES.

GIRGE, the capital of Upper Egypt, and the residence of the Bey, situated about 400 yards from the left bank of the Nile. This town is about a league in circumference, and has several mosques, bazaars, and public squares; but it has no remarkable buildings nor ancient edifices, whence some have inferred that it is a modern building, more especially as Abufida does not mention it. The Bey lives in great state, and continues in office three or four years, according to the pleasure of the divan at Cairo. His soldiers commit innumerable outrages. The Copts are not allowed to have churches in that town; and therefore when they would join in divine service, they are obliged to go to a convent situated on the other side of the Nile. The Franciscans, who have a convent here, pass for physicians, but they are frequently exposed to danger from the influence of the Janizaries, the most refractory of whom are bent hither from Cairo; 160 miles N. of Syene. N. lat. 26° 30'; E. long. 31° 32'.

GIRGENTI, or Agrigenti, a town of Sicily, near the S. coast of the valley of Mazara, erected near the ruins of the ancient Agrigentum (which see); and occupying the ground on which the ruins of the ancient city stood; the site of a bishopric, situated on the river St. Blaise, about three miles from the sea; 47 miles S. of Palermo. N. lat. 37° 22'; E. long. 13° 33'. Its situation on a mountain renders almost all the streets impassable, not only for carriages but even for men. The population of Girgenti falls short of that of the ancient Agrigentum, which Empedocles reckons at 820,000; whereas at present, reckoning the city, properly so called, which was the ancient city, the suburb of Camiico, and that built by Henry and Constance in the 12th century, it is reduced to 15,000 persons, generally poor and of a melancholy appearance. The nobility here are poor, and live in great privacy; the merchants, wholly taken up with their own affairs, live nobody but at the exchange; without society and without amusements, every body is, or appears to be, gloomy and devout. The port of Girgenti, very different from the mole of the ancient Agrigentum, which was at the mouth of the Aragona, and of which not a space is left, is subject to the same inconvenience with that of the harbours of Apulia and Calabria, which is that of being liable to be filled up equally by two opposite winds, viz. the south-easterly and north-westerly. The two piers erected to remedy this inconvenience having been found insufficient, the government has been obliged, as at Cortona, to employ galley-slaves for emptying and cleaning the entrance of this port; nor can their laborious work be abandoned on account of the importance of this harbour in the exportation of commodities from all the southern part of Sicily; and the shelter it affords to the Neapolitan vessels in the seas most exposed to the Bar- bary corsairs, being almost within sight of Africa. Near the mole are the admirable magazines of the Caritatoria,' the richest in Sicily, confiding of caverns or cellars cut out of the rock, in which the corn is preferred without the least injury. These magazines belong to the kings, and secure the sufficiency of the island. Foreign merchants resort hither to purchase the surplus, after referring enough for the home consumption. The king is accountable for the corn lodged there, and the proprietors have only a small sum to pay for flore-house rent.

GIRGITES, a name used by some chemical writers for a sort of white fluxes found in rivers, of which they make a peculiarly strong line. The fluxes are of the parry kind, wrought into round balls by the motion of the water; and they have their name girgites, from the word gir, used by the chemists for lime.

GIRGITZA, in Geography, a town of Walachia; 40 miles N. N. E. of Bucharest. N. lat. 43° 17'; E. long. 26° 19'.

GIRIA, a town of the island of Cephalonia; 16 miles W. of Cephalonia.

GIRKIN, among Gardeners. See GUERRIN.

GIRLE, or Gyrles, among Sportsmen, denotes the roebuck in its second year.

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 Beynost. The place contains 1700, and the canton 9572 inhabitants, on a territory of 150 kilometres, in 19 communes.

GIRON DE LOYARA, GARCAS, in Biography, 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 refused to him the archdeaconry of Guadahorn, which is one of the dignitaries 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 Giron his vicar-general 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 pupils, 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." Moret.

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 Quito.

GIRON, or Girvan, in Heraldry, denotes a triangular figure having a long sharp point, not unlike a wedge, terminating in the centre of the escutcheon.

The word is French, and literally signifies the germination or lap; because, in cutting, the keys being suppurated somewhat afunder, the two thilids, together with a line imagined to pass from one knee to the other, form a figure somewhat similar to this.

When a coat has six, eight, or ten of these girons, meeting or centering in the middle of the coat, it is said to be gironne or gironnay.

GIRODNE, in Geography, a river of France, formed by the union of the Garonne and Dordogne; 12 miles N. of Bordeaux, which runs into the Atlantic, after a course of about 27 miles N.N.W.

GIROINV, one of the nine departments of the south-west, or Garonne region of France, deriving its name from the river Gironda. It is a maritime department, composed 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 Bordeaux. This department contains 11,727 kilometres, or about 547 square leagues, and 519,685 inhabitants, and is divided into six districts; viz. Blaye, comprising 4 cantons, 61 communes, and 52,026 inhabitants; Libournne, including 59 cantons, 143 communes, and 108,576 inhabitants; La Reole, comprising 6 cantons, 118 communes, and 357,705 inhabitants; Bazas, containing 7 cantons, 68 communes, and 475,449 inhabitants; Bordeaux, comprising 18 cantons, 193 communes, and 333,621 inhabitants; and Libourne, containing 4 cantons, 57 communes, and 30,808 inhabitants. Its contributions amount to 5,853,653 francs, and the expenses for administration, justice, and public instruction to 533,643 francs. The soil of this department is various; the cast and north-east districts are the most fertile. In the valley between Agen and Bordeaux, the soil, though light, is of an excellent quality. The west and south-west tracts are sandy, marshy, and barren, or indifferently fruitful. The products of the soil are grain, hemp, tobacco, wine and fruits, pastures, considerable forests of pines, stone quarries, mineral springs, &c.

GIRONELLA, a town of Spain, in Catalonia; 7 miles E. N.E. of Sollomana.

GIROVNE. See Giron.

GIROVS, St. a town of France, and principal place of a district, in the department of the Arrons; 21 miles W. of Tarascon. N. lat. 42° 59'; E. long. 1° 13'. The place contains 5854, and the canton 14,953 inhabitants, on a territory of 287¼ kilometres, in 16 communes.

GIROST, a town of Peria, in the province of Kerman; 125 miles S. of Shirjan.

GIROCK, in Ichthyology, the common English name of the fish called the Lucius, a large species of garfish, caught in the Mediterranean and English seas.

GIRONNAY, Girone, 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 gironne; when there are more, or fewer, the number is to be expressed: gironne de four, of fourteen, &c.

Some, instead of gironne, say, pair, couple, tuncle, and taille, because the girons are formed by such divisions of the field. Four girons form a tunic, and eight a croix.

GIRT, in measuring timber, is used for the circumference of a tree. See Goggsfield's Sliding rule and Dendrometer.

Some call the fourth part of the circumference the girt, and fuppose the square of this equal to the area of the section of the tree.

GIRT, in Architecture, the same with fillet. See Fillet.

GIRT, gilt, in Sea Language. See Girdling-girt.

Girt-line is a rope passing through a single block, on the head of the lower masts, 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 little 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.

GIROVE, in Geography, a town of Peria, in the province of Musanderan; 5 miles E of Pehrubad.

GIRVAN, a sea-port of Scotland, in the county of Ayr, situated at the mouth of the river Girvan, 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 1629, of whom 1360 were employed in trade and manufactures. The neigh-
neighbourhood abounds with limestone and coal; 21 miles
S S W of Avr. N lat 55 18'. W long. 4 44'.

GISARMS, or GUSARMS, in our Old Writers, an hab-
bert or handek; it comes from the Latin bis arm., because
it wounds on both sides. Shen. "El armorum genus
largo manambio et porenta cupide." It is mentioned in
the statute 13 Edw. I. cap. 6.

GISBOROUGH, in Geography, a market town and
parish in the North Riding of the county of York, is feated
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 contained 538
houses and 1719 inhabitants. In the time of King James I,
some stone 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 Scripure Geography, a town of the tribe
of Abieth, in Lower Galilee; S E of Jotapata.

GISMA, in Botany, named by Linnaeus in honour of
his pupil Dr. Paul Dietrich Gilke, professor of Natural
History at Hamburg, and editor of the "Predictriones in Ordines
Naturales Plantarum," compiled from his own notes and that
of Fabrius, taken from the mouth of Linnaeus, and pub-
Goota. v. 3. 67. t. 2. f. 1.)—Cliffs and order, Pentadactyla

Gen. Ch. Cal. Perianth of five ovate, concave, obu-
te, permanent leaves, with membranous edges. Cor. none. Stam.
filaments five, short, awl-shaped, ovate at the base; authors
roundish. Pif. German superior, roundish, retuse, deeply
five-lobed; styles five, short, recurved; stigma obtuse.
Peric. Capsules five, roundish, slightly compressed, rough,
often, clothe together, each of one cell. Seeds solitary, ovate,
smooth.

five, approximated, roundish, sgle-feafed.

Earl-Indies. A smooth annual herb, with the aspect of an
Illecebrum or Pharmacum. The flower are prostrate, a foot
or two in length, furrowed along their upper side, alternately
branched. Leaves opposite,环节ed, ovate, entire, light
green, rather flabby. Flowers small, green, in little axillary
umbels Fruit blackish. On the short axillary branches, the
leaves, as Juciféru well observe, are oppoite. No other
species has been discovered.

GISIO, in Geography, an island on the E. side of the
gulf of Bothnia. N lat 61 42'. E. long. 21 22'.

GISGI, a town of Transylvania, near the Maros; 14
miles S W of Milkenbach.

GISH, a town of Georgia, in the province of Kaka;
115 miles S E of Tiflis.

GISUBEL, a town of Bohemia, in the circle of Ko-
ingenugratz; 22 miles E N E of Konieugratz.

GISING, a town and castle of Hungary; 14 miles
S W of Steinam-Auger.

GISIO, a town of Sweden, in Angermannland, on the
Gides; 16 miles W of Nordmalling.

GISLAVY, a town of Sweden, in the province of Sma-
land; 40 miles S W of Jonkoping.

GISON, or GISIO, in the Jewish Antiquities, a little
wall about breaf high, made round the temple properly fo
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

GISORS, in Geography, a town of France, in the depart-
ment of the Eure, and chief place of a canton, in the dis-
trict of Les Andelys; 27 miles N E of Evreux. The
place contains 3500, and the canton 9496 inhabitants, on a
territory of 1451 kilometres, in 23 communes. N. lat.
49 17'. E. long. 17 50'.

GISINGHEIM, a town of Germany, in the county of
Wertheim; 15 miles S of Wertheim.

GISTAIN, a town of Spain, in Aragon, situated on a
brook in the Pyrenees, on the confines of France, having
in its vicinity mines of coal; 15 miles N of Afnla.

GISTO, a small island in the Adriatic. N. lat 44 36'.
E. long. 14 51'.

GISUND, a town of Norway, in the diocese of Dro-
them; 44 miles N W of Drontheim.

GITHAGO, in Botany, a name used by some authors,
particularly by Pliny, for the lobulum or dama gracilis.
GIT, in Geography, a town of Thibet; 234 miles N E
of Delhi. N lat 32 10'. E. long. 79 56'.

GITPOUR, a town of Mocammpour; 47 miles W S
of Mocammpour.

GITSCHIN, a town of Bohemia, in the circle of Ko-
ingenugratz; 22 miles N W of Konieugratz. N lat 50 23'.
E. long. 15 20'.

GITTITH. This word occurs frequenfly in the Pfalms,
and is generally translated wise-loquent. The conjectures
of interpreters are various concerning this word gittith. Some
think it signifies a fort of musical instrument; others, that
the Pfalms, with this title, were sung after the vintage;
lastly, others, that the hymns of this kind were invented
in the city of Gath. Calmet is rather of opinion, that it was
given to the clafs of young women, or songresses of Gath,
to be sung by them. (Pl. viii. 1. xxxi. 1. xxxiv. 1.) Dr.
Hammond thinks that the Pfalms, with this title, were all
set to the fame tune, and made on Goliah the Gittite.

GIVA, in Geography, a town of Attic Turkey, in Na-
tolus; 32 miles S E of Miletus.

GIVANROTOMO, a town of Naples, in Capitanata;
9 miles W of Monte St. Angelo.

GIUDEL, a small island, near the south coast of Sar-
dinia. N. lat. 39 1'. E. long. 9 3'.

GIUDUCCA, L. A. or LIEUCCA, one of the islands ad-
joining to the city of Venice, which is said to owe its name
to the Jews, who formerly refided there. It contains 10
churches, 4 monasteries, and as many nunneries.

GIVEN, DATUM, a term very frequently used in Ma-
thematics, 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
call it given in position.

Thus, if a circle be actually decribed 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 decribed.

If the kind or species of any figure be given, they say,
given in specie. If a ratio between any two quantities is
known, they are said to be given in proportion. See Data.

GIVET, in Geography, a town of France, in the depart-
ment of the Ardenes, 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 3533, and the canton 8445 inhabitants, on a territory of 150 kilometres, in 29 communes.

GIUF, Lj, a district of Arabia, in the province of Nedjed; E. of mount Ramleh.

GIULA, a town of Hungary, situated on the river Keres; 52 miles N. N. W. of Temeswar. N. lat. 40° 35'. E. long. 20° 55'.

GIULAB, a town of Abashe Turkey, in the government of Diarbekir; 18 miles N. E. of Ourfa.

GIULEN', a small island in the Caspian sea; 130 miles S. of Afrachan. N. lat. 44° 15'. E. long. 47° 49'.

GIULIA Neoven, a town of Naples, in Abruzzo Ultra, on the coast of the Adriatic; 12 miles E. N. E. of Teramo.

GIULLA, St. a town of France, in the department of the Sura; 12 miles S.G.W. of Acquit.

GIULIANO, Sr. a mountain of Etruria, near Pisa, at the foot of which are warm baths, known in the time of Pliny.—Albo, a town of Naples, in Capitanata; 9 miles W.S.W. of Dragonera.—Allo, a town of Naples, in the county of Molife; 13 miles S.E. of Molife.—Albo, a town of Naples, in the province of Ortona; 17 miles S.S.W. of Brindisi.—Albo, a town of Italy, in the department of the Omon; 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 Lyons; 12 miles S. of Lyon. The place contains 5265, and the canton 19,590 inhabitants, on a territory of 97 kilometres, in 13 communes.

GIVRY, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Chalon-sur-Saone; 4 miles W. of it. N. lat. 48° 47'. E. long. 4° 50'. The place contains 2582, and the canton 11,405 inhabitants, on a territory of 132 3/4 kilometres, in 19 communes.

GIUSEPE April. See TENDUCCI.

GIUSEPE ARENA, in Biography, an able composer of Naples, whose style had much of the brilliancy of that school. In 1741 he set the serious drama of Tigrane, written by Goldoni, to music, for the great theatre of St. John Chry- fitosom, at Venice, which established his character.

GIUSMARK, in Geography, a town of Curtidjan; 80 miles S.S.E. of Batlis.

GIUSTENDIL, a town of European Turkey, in Bulgaria; 24 miles S. of Sophia.

GIUSTINELLI, in Biography, a second-rate Italian singer in soprano, arrived here, in 1762, with De Amicis and her family, as first serious man in the burletta operas. He had a good voice, and sufficient merit to supply the place of second man on our stage, in the serious operas, for several years after.

GIUSTINIANI, AUGUSTIN, was born at Genoa in 1470, was educated for the church, and in 1514 was made bishop of Nebbio in Corsica. He published, in 1516, a Pflater in four languages, viz. the Hebrew, Greek, Arabic, and Chaldean, with interpretations: this was the first of the Polyglott 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 presented to the republic of Genoa. In the year 1536, in passing by sea to his bishopric, he was lost with his ship. This prelate revised and edited the treatise written by Porcheti, entitled "Victoria adversus impios Judaeos." Some time after his death, were published his "Annals of the Republic of Ge- noa," from the foundation of the city, to the year 1528: this work is highly esteemed for its information, and for the veracity of the facts. Moreri.

GIUSTINIANI, BERNARDI, a Venetian nobleman, born in 1408, was educated under the most learned persons of his time, and obtained a high celebrity for his own knowledge and eloquence. He was employed on several honourable occa- sions by the republic. In 1451 he was appointed to receive the emperor Frederic III when he passed through the Venetian territories. He was afterwards elected as a fit person to be sent on embassies to Ferdinand, king of Naples, to several of the popes, and to Lewis XI, king of France, who honoured him with knighthood. In 1467 he was made captain-general of Padua, and admitted to almost all the honours of the state, and finally procurator of St. Mark. He died in 1480. He was author of many works: as public orations: the life of his uncle "The blessed Lorenzo Giustinianii"; three pieces on the life, the translation, and the appearance of St. Mark: a version of the book of Socrates to Niccolis; some Latin letters of his father Leonor; 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, and is highly esteemed, because the authorities are drawn from the best sources, and the author rejects the fables handed down by some other writers. Moreri.

GIZE', GIZAI, or Jiza, in Geography, a considerable town of Egypt, extending along the west bank of the Nile, on the other side of the island of Kouda, or Raonda, with respect to Cairo; 3 miles S. W. of Cairo. This town was fortified by Imam Bey, who also built a palace there, completed and finished by Murad Bey, who has established a cannon foundry. Here is also a manufacture of sal ammoniac. The walls of Giz are of great extent, and have only one gate to the country; they are ten feet high, three feet thick, and have six half-moons; but are only fit to repel cavalry, the original intention in building 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 cafe or luxury. Murad Bey has, of late years, thought it necessary to substitute a marine, having purchased some vessels of the Europeans, and built three or four others. The largest of these vessels carries 24 guns; those that are occasionally moored before Giz cannot be navigated hence, except during the time of the Nile's increase. The mariners are chiefly Greeks of the Archipelago. Not far south of Giz is "Geziret-el-dahah," a small island, which Diodorus Siculus denominated "Venus Auroa." N. E. of the city are gardens, and some spacious houses, occupied 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 mountain is of white sand and calcareous stone, and delittu of verdure. The numerous date-trees by which Giz is surrounded, interpenetrated 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 aspect. Dr. Shaw is of opinion, that the ancient Memphis stood on the site of Giz; but this is disputed by Savary and others. (See MEMPHIS.) This is the nearest spot, says Sennini, 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 indiscrimi-
nately called the "Pillars of Memphis," or the "Pillars of Giz". This town was taken from the French by the Brit- 
his June, 1801. Browne's Travels in Africa; Savary's Letters on Egypt, vol. i. Sommii's Travels in Upper and 
Low Egypt.

GIZIGNSKAIA, a gulf at the N. W. extremity of 
the Psenndoi sea, extending about 50 miles in length, and 16 
breadth. M. lat. 67 to 68. E. long. 160 14'.

GIZZARO of Birds. See Anatomy of Birds.

GIZZIELLO, Gioachino, Conti, in Biography, one of 
the greatest Italian singers of the last century, arrived in 
England in 1756, as Handel's first singer, at the time that he 
had quitted the Royal Academy in the Haymarket, upon a 
quarrel with Samphire, and set up for himself at the new the- 
atre in Covent Garden. The nobility and gentry who seem 
-to have abetted Samphire, engaged for the Handel 
Haymarket Porpora as a composer, and Farinelli, Cazzoni, and 
complete company of vocal and instrumental performers to 
oppo he. Handel, May 5th, opened his summer cam- 
paign with the revival of "Ariodante," an opera of the pre- 
ceding year.

The next day the following eulogium on his new finger 
was inserted in the Daily Poet: "last night Signor Gio- 
chino Conti Gizzuelo, who made his first appearance in 
the opera of "Ariodante," met with an uncommon reception; 
and in justice both to his voice and judgment, he may be truly 
commended one of the best performers in this kingdom. Ne- 
ather his friends nor the friends of Handel could ventute to 
fare more, while Farinelli was in the kingdom. Conti was 
at this time a young singer, more of promising, than mature 
abilities; and to modell and difficult, that when he first heard 
Farinelli, at a private rehearsal, his heart burst it tears, and 
fainted away with despondency. He had been confraternized 
Gizzuelo from his master, Gius, once an eminent flage 
singer, who, in his old age, became an excellent master.

The next opera in which Conti appeared, was "Ata- 
lanta," composed as an epithalamium on the marriage of his 
royal highness Frederic prince of Wales, with his serene 
ligeous the princes of Saxo-Gotha. The casts in "Atalanta," which Handel composed expre- 
ply for his new finger, Conti, feem, upon examination, 
to have been written in his new, graceful, and pathetic stye 
of singing. The hals and accompaniments, too, are of 
a modern cast, and, except the closes and two or three of the 
divisions, the whole feems of the present age.

Handel, till now ill, had a first man to write for which 
so high a soprano voice. Nicollini, Samphire, and Carefelli, 
were all contraltos. There was often dignity and spirit in 
their style; but Conti had delicacy and tenderness, with the 
accumulated refinements of near thirty years, from the time 
of Handel's first tour to Italy. We think it is not difficult to 
discover, particularly in the first act, that in composing 
Conti's part in this opera, he modelled his melody to the school 
of his new finger. Indeed, Handel was always remark- 
ably judicious in writing to the tale and talents of his 
performers in displaying excellence, and covering imperfec-
tions.

While Conti was his first male singer, and the Strada his 
first woman, he revived his opera of "Alceina and Farandoni," 
and composed his part in the opera of "Arminio," expressly 
to display his peculiar talents; in the airs of which it feems 
as if Handel had more busses and accompaniments in iterated 
notes, than in any preceding work.

He was advancing rapidly in the modern style of opera 
songs when he quitted the stage, and retreated back to a 
more elegant and ballad style for the church.

GLA

It is chiefly in writing for Conti and Anibali, that the con- 
formity 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 "Arminio," 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 farewell, ad 
bidding, at the beginning; but no peculiar taste, expression, 
or powers of execution, appear in his part; his bravura air 
in the second act, St. cedus, 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 rapturized in speaking of the 
pleasure which they had received from fingers of the first clafs.
But to return to Conti, who, after he quitted England, stud- 
ed with such diligence, that being engaged at Madrid to 
sing in the opera under the direction of Farinelli, he turned 
the tables on that wonderful finger, in whom it has been 
said, that he excited envy by his new and refined taste and 
patios.

He was one of the constellation of great fingers which the 
king of Portugal had assembled together in 1755.

There were, according to Pacchi rotto's account, Elfi, 
Manzelli, Cialarelli, Gizzuello, Veroli, Batti, Luciani, Raef, 
Raina, and Guadagni. No females were then allowed to 
appear on the opera stage in Portugal. Gizzuello, narrowly 
escaping with his life during the dreadful earthquake which 
happened at Lisbon that year, was impressed with such a 
religious turn by that tremendous calamity, that he retreated 
in a monastery, where he ended his days. It was soon after 
this event, that Guadagni find himself up in the fame con- 
vent not so much for spiritual consolation as for musical 
counsel; which he so effectually obtained from the friendship of 
Gizzuello, that from a young and will finger of the second 
and third clafs, he became, in many respects, the first finger 
of his time.

GLABALK, 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 230, and the 
canton 67,71 inhabitants, on a territory of 120,000 ofare, in 
19 communes.

GLABELLA, in Anatomy, from glaber, smooth; the 
space between the two eye-brows, which is ordinarily not 
covered with hairs.

GLABER, in Biography, a Benedictine monk, who 
founded 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 pre- 
vioius to Hugh Capet, and the four subsequeute to 
three following it, as far down as the year 1046. 
This work is defective 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. 
Moreni.

GLABRARIA, in Botany, so denominated by Lin- 
neus, on account of the smooth, shining, silky appearance of 
Mart. Mil. Ditt. v. 2. Juff. 533. La- 
mark, Illustr. t. 640. Clafs and order, Alomnpholi Polygo- 
dria. Nat. Ord. "uncertain; perhaps akin to Styrax." 
Jaff. Rader Malvacee, near Davia.

Gen. Ch. Cont. Parnass inferior, of one leaf, tubular 
half as long as the corolla, cut half way down into five equal 
webu
GLACIALIS. Ice, or glaciers, is, something relating to ice; and particularly a place that abounds in ice.

We thus lay, the Marc Glacier, or Congladium, that is, the ice or frozen sea; called also the Chthonian or Sarumian 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 Geneva, and unite at the foot of Mont Blanc; they are called Tacona, Boloni, Montanvert, Argenburi, 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. Coxe has given us an abstract of the theory of Gruner, with regard to their formation, and other particulars respecting them, confirmed and amended by that able naturalist Saussure; 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 chain of mountains, intersected by numerous valleys, 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 lie would discover deep valleys 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 overspread with 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 valleys which border the great chain. In pursuing 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 sorts; the first occupying the deep valleys situated in the bottom of the Alps, and termed by the natives "Valées de Glace," distinguished by Mr. Coxe by the name of "Lower Glaciers." 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 extending into the cultivated valleys. Saussure found the general depth of the ice in the glacier des Bois from 82 to 100 feet; but there is reason to believe that its thickenings in some places exceed even 625 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 33 or 40 degrees. But in those parts, where the plane on which they rest is nearly horizontal, or gently inclined, the surface of the ice is nearly uniform; the chains 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 defiles. 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 congladion of snow impregnated with water, in opacity, roughness, and the number as well as fluidness of the air-bubbles, led Saussure to conceive the following simple and natural theory concerning the formation of the glaciers. An immense quantity of snow continually accumulates in the elevated valleys enclosed within the Alps, as well from that which falls from the clouds during nine months in the year, as from the mists incessantly rolling from the steep sides of the circumjacent mountains. Part of this snow, not dissolved during summer, impregnated with rain and snow-water, is frozen during winter, and forms that opaque and porous ice of which the "Lower Glaciers" are composed. The "Upper Glaciers" may be subdivided into those which cover the summits, and those 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 congealed into a hard substance, and not converted into ice. The substance which clothes the sides of the Alps is neither pure snow, like that of the summits, nor snow which forms the Lower Glaciers, but an assemblage of both. It contains less snow than the summits; because the summer heat has.
has more power to dissolve it, and because the liquefied snow descending from above, the mass absorbs a larger quantity of water. It contains more snow than the Lower Glaciers, because the dissolution of the snow is comparatively late. Hence the ice is even more porous, opaque, less compact than that of the Lower Glaciers, and of so doubtful 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 assimilates 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 mass 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 latter alternative. In 1785, the inferior glacier of Grindelwald was diminishing at least 400 yards since the year 1776; in the valley of Chamouny, the glaciers called "les marmailles de glace," from their resemblance to walls, and which rise in very thick, solid, parallel ranges to a height of 150, or, as some say, 400 feet above their real base, and forming the border of the glacier of Boffon, no longer existed, and young trees had shot up in the parts which were then covered by the glaciers of Montanvert. The advocates for the increase of the glaciers, notwithstanding these facts, applicable, as they say, to the lower regions, assert, both from theory and observation, that more snow falls, and more ice is annually formed in the Alps than can be annually dissolved. From theory they argue, that the cold occasioned by the mass 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 covered, many pastures and habitats invaded, and many passages irrecoverably obstructed by the ice. In reply to the argument from theory it is maintained, that the causses which lead to the diminution of the ice are not less powerful than the augmentation of the cold, which is supposed to occasion its indefinite increase. These causses are principally rain and snow in the lofty elevated regions, evaporation, defeat of the snow and ice, both precipitous 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 progress of the ice are admitted, it by no means seems to follow, that its mass is perpetually increasing. For the advocates of this opinion, while they scrupulously enumerate the places which have been invaded by the ice, do not take notice of these facts, 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 aggregate quantity is nearly the same. Coxe's Travels in Switzerland, vol. ii. GLACIES MARLE. See Specularis Lapis.

GLACIS, in Building, an easy inflexible slope or declivity. The descent or inclination of the glacis is less steep than that of the talus. In gardening a descent 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 descent and draining off of the rain-water.

GLACIS, in Fortification, is particularly used for that of the counterescarp, being a sloping bank, which reaches from the parapet of the counterescarp, 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 distinctly 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 counterescarp of the ditches, at six toises distant from it; and the space \( \times \times \times \), included between that line and the counterescarp, will be the covert-way required. If lines are drawn parallel to the lines which terminate the covert-way, and the places of arms \( \times \times \), at twenty toises distant from them, the space \( \times \times \times \), between these lines will be the glacis. As in this figure, represents the arrow; \( \times \), the detached redoubt; \( \times \times \), the traverses; \( \times \times \times \), the full-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 traverses and places of arms, and a second 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 Weilphalia, 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, otherwise called pursue-wort.

GLADE, in Agriculture, Gardening, &c. a vilia, 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 Gießen.

GLADIATORS, in Antiquity, persons who were retained to fight ordinarily in the arena, for the entertainment of the people.

The gladiators were usually slaves. and condemned criminals, 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 dismissed.

The Romans borrowed this cruel diversion from the Aetaciscs: 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, lib. xxiii. sacrifices twelve young Trojans to the names of Parados; and in Virgil, lib. xi. ver. 81. Augustus sends captives to Evander, 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 esteemed 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 encourage to save their own lives by killing their adversaries. This seemed somewhat less inhuman, because there was a possibility of avoiding death by an exertion of skill and courage.

This
This occasioned the profession of gladiator to become an art; hence profane masters of arms, and men learned to fight and exercise this art.

These matters, whom the Latins called lanificii, bought slaves to be trained up to this rude trade, whom they afterwards sold to such as had occasion to prevent 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 ordinary amusements. See BUSTUARI.

The first show of gladiators, called munus gladiatorum, was exhibited at Rome, according to Valerius Maximus, by M. and D. Brutus, upon the death of their father, in the year of the city 488; 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 four sons of M. Emilius Lepidus the augur, who had been three times consul, entertained 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 547, 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 552d year the sons of M. Valerius Lavinus exhibited 25 pairs of gladiators; and in 569, 73, and 578, 74 fought on the like occasion. In precedes of time, the Romans became to fond of these bloody entertainments, that not only the heir of any great and rich citizen lately deceased, but all the principal magistrates, prevailed the people with shows of this nature, to procure their affection.

The audles, pretors, consuls, and, above all, the candidates for offices, made their court to the people, by entertaining them frequently with these fights: and the priests were sometimes the exhibitors of the barbarous shows; for we meet with the ludi pontificales in Suetonius, August. cap. 44, and with the ludi sacerdotales, in Pliny, Epil. ii. 77. As for the emperors, it was so much their interest to ingratiate themselves with the populace, that they obliged them with combats of gladiators almost upon all occasions, and as these increased, the number of combatants increased likewise. Accordingly, Julius Caesar, in his adileship, 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 Domitius's combats of gladiators are noticed in the last 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 sights of gladiators, though long authorized by custom, afforded no pleasure to Vespasian. 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 forty days the following winter. Before this time, under the republic, the number of gladiators was very great; that when the conspiracy of Catiline broke out, the Senate ordered them to be dispersed into the garrison and secured, lest they should have joined the disaffected party. See GLADIATORS' WAR.

These 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 fifty couples of combattants in a show. And Tiberius provided by an order of Senate that no person should have the privilege of gratifying the people with such a solemnity, unless he was worth four hundred thousand sesterces. They were also considerably regulated by Novus.

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 too 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; infamously, that Cicero more than once proposes 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. (Tufc. ii. 1.)

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 senatorial 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 senators, and six hundred Roman knights upon the arena; though Lippius takes both those numbers to be falsified, and, not without reason, reduces them to forty senators, and sixty knights. Not only senators, but even women of quality, fought in public in some of Nero's combats of gladiators. On occasion of the triumph of Probus, A.D. 281, about fourteen thousand gladiators, together with near 600 others, exhibited the most desperate courage, for the inhuman sports of the amphitheatre. Dismaying to flay their blood for the amusement of the populace, they killed their keepers, broke from the place of their confinement, and killed 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, B. i. p. 65.); yet Domitian, that other monster of cruelty, relented 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,
never admitted bloody shows into their city; and when it was proposed to establish combats of gladiators there, in order not to give place in that respect to the Corinthians, "First throw down," exclaimed an Athenian in the midst of the assembly, whose name was Demosthenes, a famous phi-
losopher, who flourished in the reign of Marcus Aurelius, "the altar which our forefathers above a thousand years ago erected to Mercy."

Some Persian emperors, lamenting the sad 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 shew their address, without any danger of being killed. But the honour of suppressing these combats was reserved for Christi-
nanity; 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 preoccupation of many ages, and the opinion of the world, that these combats were accept-
able 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 em-
ployed; there being an order still extant to the prefectus praetorii, rather to fend them to work in the mines in lieu thereof; it is dated at Berytus, in Phoenicia, the 18th of October, 325.

But, notwithstanding this edict, which condemned the art and amusement of shedding human blood, the benevolent law exaimed 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 extir-
pate, by his authority, the horrid custom which had so long reftilled the voice of humanity and religion. The pathetic repre-
sentations of Prudentius were not effectual than the generous 
holdness of Telemachus, 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 rath 
munk, who had defended into the arena, to separate the 
gladiators, was overwhelmed under a flower of flowers. But 
the madness of the people soon fubducted; they respeeted the 
memory of Telemachus, who had deferved the honours of 
martyrdom; and they submitted, without a murmur, to the laws of Honorius, which abolished for ever the inhuman 
facrices of the amphitheatre. The citizens, who adhered 
to the manners of their ancestors, might perhaps inominate, 
that the last remains of a martial spirit were prefered in 
this school of fortitude, which encouraged the Romans to 
the fight of blood, and to the contempt of death—a vain 
and cruel prejudice, to beoly confuted by the value of an-
cient Greece, and of modern Europe.

It must be observed, however, that the practice was not 
totally 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 520, abolished them 
finally.

Some time before the day of battle, the person who pre-
fented the people with the shows gave them notice thereof, by programmata, or bills, containing the names of the 
gladiators, and the marks whereby they were to be dif-
tinguished; for each had his peculiar badge, which was, most 
commonly, a peacock's feather, as appears, from the Schol-
sia of Juvenal, on the 158th verse of the third Satire, and 
Tunuebus Adverf. 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 52d verse of the seventh Satire of the second book of Horace, that they sometimes made 
representations of these things in painting, as is prac-
ticed among us by those who have any thing to show at 
airs.

The day being come, they began the entertainments by bringing two kinds of weapons; the first were swords, or wooden files, called rudes; and the second were effective 
weapons, as swords, poniards, &c.

The first were called arma inuerio, or exercitio; the se-
cond decuritaria, as being given by decree or sentence of the 
prætor, 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 laid versus armis; the terms of striking 
were potece et repetere; of avoiding a blow, evite; and 
when one of the combatants received a remarkable wound, 
his adversary or the people cried out, habes, or hoc habes.

The first part of the engagement was called annalizes, 
praetorii; and the second, decuritaria ad certum, or victis 
armis injure; and some authors think, with much proba-

dility, that it is to these two kinds of combat that St. Paul 
alludes, in the passage 1 Cor. ix. 26, 27. "I fought, not as 
one that beateth the air; but I keep my body, and bring it 
to 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 spectacles; 
sometimes they gave him his congé, or dímmíssus; by 
putting one of the wooden foils or rudis in his hand; and 
sometimes they even gave him his freedom, putting the 
pikeus on his head.

The fign or indication whereby the spectatots shewed 
that they granted the favour, was premere pollieem, 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 vestivertis 
pollieem, bent back the thumb; which we learn from Juve-
nal, Sat. ii. ver. 36.

"Munera nunc edam, et verbo pollicie vulgi 
Quemlibet occidere populariter."

The gladiators challenged or defied each other, by shewing 
the little figner; and, by extending this, or some other, 
during the combat, they owned themselves vanquished, and 
begged mercy from the people; "Violi offendam digitii ve-
nianis a populo pollubant," says the old Scholastic on Per-
Politian.
GLA


There were divers kinds of gladiators, distinguished by their weapons, manner, and time of fighting, &c. as, the andabates, of whom we have already given an account under ANDABAT.

The caturarai, who always fought in troops or companies, number against number; or according to others, who fought promiscuously, without any certain order. Lipp. lib. ii. cap. 16.

The confonmati, whom authors mention as a species of gladiators, the fame with the radiarii and veterani; founding the opinion on a passage in Pliny, lib. viii. cap. 7. But Lippus thinks that the have mistaken Pliny. Saturn. lib. ii. cap. 16, and Turneb. Adverf. lib. xxx. cap. 35.

The cubicularia, which are a little precurious, being chiefly founded on a passage in Lampridius, in the life of the emperor Commodus: "Inter hire, habitu victoriiarn, victimas immolavit, in arena radibus, inter cubicularia; gladiatores paginant lucentibus aliquando mucronibus."

Turnebus reads radiarius instead of cubicularia: and understands it of those who had been disfigured, and could no longer be obliged to fight, except with foils.

Salmasius reads gladiator; and refers it to the emperor, who fought not only on the arena, and with foils, but also with blunted instruments, but at home, with his servants and valets de chambre, and with thumps.

Lippus will have nothing altered in the text: the gladium, or armis cubiculairis, he observes, were those who fought at private houses, during feasts, &c. Accordingly, Dion says expressly, that Commodus sometimes fought at home, and even killed some persons in such revellings; but that, in public, he only fought with blunted weapons.

The dunaga, who fought armed with two poniards, or swords; or with sword and dagger. Lipp. Saturn. lib. ii. cap. 13.

The affedarii, who fought in cars; called also, in an inscription lately discovered at Lyons, affedaria. Saturn. lib. ii. cap. 13.

The sículo, or Cafariosi, who belonged to the emperor's company; and who, being more robust and dexterous than the rest, were frequently called for, and therefore named allo postulatini. Lipp. lib. ii. cap. 16.

The other kinds were, the lophmaci, meridiani, myrmilloi, ordinarii, pinicarii, procuciones, retiarii, radarii, Samiti, scutarii, scipiatarii, and Thraci; which see described under NERIDIANI, RITARI, SECUTARI, &c.

Some authors, and particularly Vigenere on Livy, rank the obsoleti, or obsolete, as mentioned by Spartan, in his life of Marcus Aurelius, among the number of gladiators; Lippus ridicules him, Saturn. lib. ii. cap. 13, and with some reason: the obsolete properly were the troops which that emperor raised among the gladiators; or whom of gladiators he made soldiers.

GLADIATORS' war, bellum Gladiatorum, or Spartaeanum, called also the servile war, was a war which the Romans fulfilled about the year of their city 680. Spartaeanus, Cris. Oenomus, 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. Cassius was not able to finish it: the great Pompey was forced to be sent as general.

GLADIATORS, dying, is a most valuable monument of ancient sculpture, which is now preferred in the palace of Chigi. This man, when he had received the mortal stroke, is particularly careful, ut proculabat biceps, 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 season of distress, and that attitude which they had learnt of the masters of defence. He fears not death, nor seems to betray any token of fear by his countenance, nor to shed a tear: quis medius erat gladiator ingemitus, quis vultum mutavit unquam, quis non modo felix, verum etiam decubuit turpiter?" says Cicero, in that part of his Tusculanum, where he is describing the astonishing manner of these persons. We fee, in this instance, not with standing his remaining strength, that he has but a moment to live, and we view him with attention, that we may see him expire and fall: thus the ancients knew how to animate marble, and to give it almost every expression of life.

GLADIOLUS, in Nosey. See DUTUMUS and LONELA.


Gen. Ch. Cal. Spatha inferior, shorter than the corolla, of two oblong permanent valves; the outermost larger, enfolding the inner one. Cor. of one petal, superior: tube cymose, swelling upwards, curved; limb somewhat bell-shaped, irregular, in six 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. Petal. Germ. inferior, triangular; style thread-shaped; stigmas three, spreading, folded, recurved, obtuse, downy. Peric. Capsule ovate, triangular, obtuse, thin, of three cells and three valves. Seed numerous, smooth, surrounded with a membranous wing.


Twenty-four species of this genus are defined in the 14th edition of Linnæus's Systema Vegetabilum, of which the ramosus, Sp. Pl. 53, belongs, we believe, to Iris, or some of its near allies. Wildenow makes 50 species, but Mr. Ker (late Gawler) has, I think, with great propriety, established the old genus Waterania, to which some of them are removed, while others go to his Tritonit or elsewhere, 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 bifolius, there called brevifolius, after Wildenow and Quinquin; while a more distinct species is figured in Curt. Mag. t. 574, by Mr. Ker as a variety of bifolius, is properly retained as being the true bifolius 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
its reformed state, adding the Linncean G. imbricatus to what the above-mentioned writers have defined.

1. G. Clusiana. Curt. t. 1. 31. (Antholiza Cumonza; Linn. Sp. Pl. 54. Willd. Fl. Pomm. t. 121. Curt. Mag. t. 34.) Redout. Lill. t. 12.—Leaves linear-forked. Upper segment of the corolla very long; lower very small. —Native of the Cape of Good Hope, nor does it appear to grow, as Linnceus affirms, in Peru. Remarkable: for the vivid scarlet of its fragrant and beautiful flowers, the three upper segments of whose corolla are broadly elliptical and violet, the middle projecting far beyond the other two; while the three lower are very small, and greenish. This is a hardy green-house plant. See Antholiza, n. 3.


3. G. quadrangularis. Ker. In Curt. Mag. t. 567. (G. abbreviatus; Andl. Rar. t. 166. Antholiza quadrangularis; Burm. 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 triflta, n. 10, and permundtis, n. 7; the flowers more agree with G. Cuninna, at least in their large vaulted upper segment, but all the lateral segments are extremely short, ovate and acute, the lowermost being the least of all. The tube is yellow flecked with orange; large segment of the limb purplish; all the red variegated with dull green and brown. According to the Linncean idea of hybrid species, this might be guessed to have originated from G. Cunimna impregnated by G. triflta.

4. G. galatia. Andl. Rar. t. 122. (G. nanaquenfis; Ker in Curt. Mag. t. 592)—Upper segment of the corolla vaulted; two lateral rhomboid; three lower pendulous, spatulate, blunt with a little point. Leaves conicous, ovate. —Native of the Namaqua country, a considerable distance from the Cape of Good Hope; early propagated by seeds or offsets, and blooming freely. The leaves are very thick, many-ribbed, ovate, obtuse, curved or oblique. Stem low, bent or zig-zag, covered with bracteas and flowers. The latter are large and showy, their three narrow drooping 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 nanaquenfis, it being contrary to rule to give the name of a country, and so peculiarly barbarous in itself. The G. galatia of Jacquin is Speratis galatia of Ker.

5. G. alata. Linn. Sp. Pl. 53. Herb. Linn. Andl. Rar. t. 8. Ker in Curt. Mag. t. 586.—Upper segment of the corolla ovate, recurved; two lateral rhomboid; three lower pendulous, spatulate, pointed. Leaves rigid, lanceolate. —Common about the Cape of Good Hope; easily increased by seeds or bulbs, but rarely flowering with us. Bears a considerable resemblance to the lath in form and colours, but the lath are narrower and very differently shaped, the lower segments of the corolla more lanceolate, the upper one reflexed. Linnceus once called this species Lathitis, but his son changed it to alatus, in allusion to the wing-like lateral segments.

6. G. viridis. Ker in Curt. Mag. t. 699. (G. alta—Jacq. Lc. Rar. t. 239. G. orchisflorous; Andl. Rar. t. 241.)—Upper segment of the corolla spathulate, archd, curved; two lateral rhomboid; three lower spathulate, pendulous, acute. Leaves straight, linear-forked. —Native of the Cape; rare in our collections. Plukcnets rude figure, t. 223. f. 8, is supposed to belong to this species rather than to the lath, for which it is quoted by Linnceus. This differs from the two preceding in having long erect narrow leaves and flowers variegated with dull green and purple, which are insufficiently fragrant. The stem is tall, and sometimes branched.

7. G. permundtis. De la Roche Diff. t. 27. t. 2 Ker in Ann. of Bot. v. 1. 323.—Leaves awl-shaped, quadrangular, erect. Upper segment of the corolla broadest, vaulted, undulated; two lateral narrow-rhomboid; three lower spathulate, 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 perversus between the segments, but this is not peculiar. That supprised variety of triflta, figured by Jacquin, Lc. Rar. t. 244, seems to be very near the present species.

8. G. verisylbora. Ker in Curt. Mag. t. 1042 and 556. Andl. Rar. t. 19.—Leaves linear-forked, 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 peculiarly 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 attaining more of a yellow hue. It differs essentially from the following in having a sword-shaped, not a quadrangular, leaf.

9. G. triflta. Linn. Sp. Pl. 53. Ker in Curt. Mag. t. 272 and 1098. Jacq. Lc. Rar. t. 245 and 243. (Lilio-gradusdiulbus et biflorus, foliis quadrangulis; Trew. Ehrn. 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 justly admired for its rich evening eence, like a pink, or a bergamot pear, especially in the most common or particular coloured variety, to which the first-quoted figure of Curtis and Jacquin refer. The deeply furrowed quadrangular corolla, like those of the Snake’s-head Iris, tub. roth, distinguish it clearly from the lath, for which Mr. Ker, we presume by mistake, quotes Jacquin’s t. 245. He likewise cites and Trew’s Ehrn is the yellowish variety, which is in a fine plate, though rather too pink, of the particular one.


Canta
GLADIOLUS.

Cant. belgicantis, nor have we seen any specimen. The short, upright, straight leaves are remarkable. The flowers are smaller than in the two last, slender; the base of their segments semi-transparent, the extremities yellowish, striped 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-pellucid, very pale purple, as long as the largest segment. —Jacquin first called this species fritatus; see Collect, v. 4, 170.

11. G. pendula. Jacq. Ic. Rar. t. 248 Coll. v. 3, 255; and v. 4, 256 t. 3, f. 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 whose figures alone we are acquainted with this plant, says it blooms with him in November. The stem is a spn high, curved and zig-zag. Flowers one or two, yellowish, more or less variegated with pale purple, smooth, about an inch and half long.

12. G. sericeus. Thumb. Diff. 18. Linnae. Suppl. 96. 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 whose figures alone we are acquainted with this plant, says it blooms with him in November. The stem is a spn high, curved and zig-zag. Flowers one or two, yellowish, more or less variegated with pale purple, smooth, about an inch and half long.

13. G. praecox. Jacq. Ic. Rar. t. 246. Ker in Curt. Mag. t. 562. —Leaves linear, ribbed, deeply furrowed on each side, with a very thin midrib. Corolla somewhat bell-shaped; segments ovate, nearly equal. Native of the Cape, easily cultivated with us, blooming in March or April. Flowers wavy, 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. 573. (G. carinatus; Wild Sp Pl. v. 1, 211. Ker in Ann. of Bot. v. 1, 231. G. punctatus; Jacq. Ic. Rar. t. 247. G. ringens; Andr. Repol t. 27 and 227. Redout. Liliac. t. 123; G. alatus; Schnee Ic. 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 its 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 flanks of Arum Dracunculus. Thunberg confounded this and gracilis with r好消息.

15. G. breviflorus. Jacq. Ic. Rar. t. 249. Dryand in Att. Hort. Kew. ed. 2 v. 1, 98. (G. breviflorus; Ker in Curt. Mag. t. 592; and Suppl. t. 727. G. carinatus; Andr. Repol. t. 240)—Leaf of the barren bulb solitary, linear, slightly downy; of the flowering one scarcely any. Corolla somewhat ringed. —Native of the Cape, readily cultivated and propagated 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 larger, vaulted, recurved at the summit. The leaves are minutely downy, upright, linear or slightly lanceolate; very short, or rather mere lances, on the

flowering stem; solitary and larger on the bulb, which produces no flowers.

16. G. biflorus. Jacq. Ic. Rar. t. 250. Dryand in Att. Hort. Kew. ed. 2 v. 1, 98. Ker in Curt. Mag. t. 574. (G. biflorus; Andr. Repol t. 111)—Leaves linear, two, deeply downy. Corolla nearly regular. —Native of the Cape; introduced into our green-houses in 1755, 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 practice this without acknowledgment.

17. G. neglectus. Thumb. Diff. 9 t. f. 1. Linnae. Suppl. 96. —Leaves linear, involute. Corolla ringed; segments elliptical-lanceolate, nearly equal, shorter than the tube. Stem zig-zag. —Gathered at the Cape by Thunberg, from whom we have a wild specimen. The stem is a spn high, irregularly curved, and zig-zag. Leaves lanceolate, blue, linear, acute, smooth, involute. Flowers large, swelling, sharply pointed. Flowers very pale flesh-coloured, with red ribs; tube capillary, an inch and half long; segments of the limb narrow, nearly equal in size, but ringed.

18. G. carneus. Jacq. Ic. Rar. t. 255. Ker in Curt. Mag. t. 591. (G. ccephalophus; Andr. Repol. t. 147. Redout. Liliac. t. 356.) —Leaves sword-shaped, many-ribbed. Segments of the corolla shorter than the tube; the uppermost broader, with an involute recurved point; the three lower narrowest, dependent. —Native of the Cape. A tall and handsome plant, with several many-ribbed leaves. Flowers inodorous, two-ranked, large, flesh-coloured with a rosy hue; their three lower segments oblong, bluish, each marked with a red rhomboidal central spot; the three upper broader, especially the top one, with long recurved points, whole edges are involute. The tube is flatter, longer than the limb, twice as long as the spathe. This freely blowing species is a desirable ornament for the green-house in the spring.

19. G. cephalephus. Jacq. Ic. Rar. t. 257. Ker in Curt. Mag. t. 582. Redout. Liliac. t. 136. Andr. Repol. 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 the 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, flamed 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 mere trouble than advantage.

20. G. blainius. Att. Hort. Kew. ed. 2 v. 1, 63. Ker in Curt. Mag. t. 625. 645. 648. Andr. Repol t. 99. (G. carinatus; De la Roche Dill. 30 t. 4. Redout. Liliac. t. 65. G. albus; Jacq. Ic. Rar. t. 256. G. campanulatis; Andr. Repol. t. 185.) —Leaves many-ribbed. Tube of the corolla shorter than the spathe, equal to the limb, which is ringed, bell-shaped, its upper segment convache; three lower narrowest, downy. —Native of the Cape. Succeeds well with us in the open ground, but the bulbs must be taken up every year. —This is an elegant species, with
lower of the sword-shaped many-ribbed kind like the two half. 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 a little in size, sometimes varying in this respect with the larger. They have no scent.

We cannot but complain of those authors who burthen the plate with figures of trailing varieties of this and other plants, for which a single plate ought to have been sufficient; nor does the contrivance of a new name, though it may conceal the imposition, by any means stone for it.

21. G. amygdalus. Lam. Sp. Pl. 52. Hort. Cliff. t. 6. Jacq. Ic. Rat. t. 252. Ker in Curt. Mag. t. 622. Andr. Repof. t. 589. Mill. Ic. t. 142. f. 2 —Leaves linear; mid-rib prominent on each side. Tube of the corolla longer than either spathe or limb; three upper segments ovate; three lower each marked with a triangular flaked spot.—Native of the Cape, from whence it was brought to Holland, and from the latter country to England by Mr. Graffier; before 1789, unless 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 flower in its natural magnificence. The rich scarlet of its 

25. G. cardinalis. Curt. Mag. t. 135. Schulze. Ic. t. 27. Redout. Lilac. t. 112. —Leaves many-ribbed, Spoon branched. Flowers erect, in one row, funnel-shaped; segments elliptical; three lowermost smallest, 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. Graffier; before 1789, unless 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 flower in its natural magnificence. The rich scarlet of its 

2. The same alludes to the scarlet colour, like that worn by the cardinals at Rome, as used by Linnaeus in Lob hie and Lob. The piaze Scopoli thought the application profane, and changed it in the latter instance to ribara. See his Annales, 1792.
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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 inflorescence, whilst his f. 1. does not shew 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 stand in our communis, we have little doubt of his synonym. The communis of the Linnaean 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. foetidum. Ker in Curt. Mag. t. 719. Dryandri, in Ait. Hort. Kew. ed. 2. v. 1. 102. (G. communis; Bulliard. Herb. de la France, t. 8. Sm. Pl. Grec. Sibth. v. 1. 27. t. 37. 38. Lamarck Ill. 32. Tourn. t. 190. G. italicus; Ger. ed. 104.)—Leaves many-ribbed. Spike one-ranked. Flowers horizontal; upper segment dilated; 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; hardy, but not frequent in gardens. It is distinctly represented in the Hortus Elytensis, by the name of Victoriae rotunda; Ord. Ed. 4. t. 10. f. 2, though the other Gladiosi of that huge book are less precise. This is distinguishable from the two 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 besides, which is a soft material specific distinction, and even forms an exception to one of the general characters. Mr. Kersuspects the existence of other European species, still confounded as varieties of thefe, and which may perhaps account for anomalies and incongruities in the figures of authors. Whether t. 38. of Flora Graece 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 G. foetidum; but this we learn merely from the figure, nor was the artist acquainted with the characters subsequently 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. speciosus of the Linnaean 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 specimens was then voted to be communis.

29. G. imbricatus. Linn. Sp. Pl. 52. Lamarck. Dict. v. 2. 723.—Leaves many-ribbed, spike of numerous, crowded, upright flowers; upper segment rather dilated; three lowermost nearly equal.—Gathered by Gerber near Luban in Livonia. His own specimen in the Linnaean herbarium is the only one we have seen, nor do recent writers appear to know any thing of this species, which appears to us very distinct, skin the three leaf 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, pervious 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 arise above the spike of flowers, and have each an oblique point, but this may not be constant.

Whatever species of Gladiosi (exclusive of such as are now referable to the genera Sparaxis, Aphanthoeca, Tritonia, Waslonia, Melapharadu or Baliana of Mr. Ker), may be found here and there in authors, we decline describing without seeing living specimens. The discordance 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.

GLADIUS, in Gardening, comprise plants of the tuberosous-root, flowery, perennial kind; of which the species mostly cultivated are the common sword-lily, or corn-flag (G. communis); the imbricated flowered gladiole (G. imbricatus); the square-talked gladiole (G. trilis); the narrow leaved gladiole (G. angustus); and the superb scarlet gladiole (G. cardinæ). There are several varieties of the fift species, as the Italian and French corn flags, with the bluish, the white, and the small purple coloured.

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 sorts may be raised in the same way as well 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 fows 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 sorts 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, Sw.nd. Jus Gladii, or right of the sword, is used, in our ancient Latin authors, and in the Norman laws, for suprême jurisdiction.

Camden, in Britannia, writes “Comitatus Fliet pertinet ad gladium Celtribri:” and Selden, Tit. of Honour, p. 549, “Curiam fuan liberam de omnibus placitis, &c. exceptis ad gladium ejus pertinentibus.”

And it is probably from hence, that at the creation of an
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earl, he is gladio fascinatus; to signify, that he had a jurif-
diction over the county.

GLADIUS, in Ichthyology, a name used by many for the
sword-fish, called also the alphon, which see.

GLADKA, in Geography, a fort of Russia, in the go-

government of Caucasus, on the Malva; 36 miles W. of

Kiliar.

GLADWIN. See Iris.

GLADWIN, John, in Biography, the late organist of South
Audley chapel, was the first performer on the organ at
Vauxhall, after the building of the orchestra in the middle
of the gardens, and the establishment of a regular band. He
was a pleasing player in his day, and a worthy man, who
lived to a great age, and died in 1799.

GLAIR of Eggs, is the same as the white of eggs, and is
used as a varnish for preserving paintings. For this
purpose it is heat to an unequable consistence, 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, Au, in Geography, a S.S.W. branch of the
Miimi 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
future, at the head of its navigable waters, and six miles
square at its confluence with the Miami, where port Defiance
now stands.

GLAMA, in Zoology. See Camelus.

GLAMMISS, in Geography, a small town in the county
of Forfar, Scotland, contains 383 houses, and 1931 inhabit-
ants. Here are two small manufactories of yarn, and coarse
linen cloth. The ears of Strathmore formerly possessed, and
occupied a noble castle in this parish. The remains of this
baronial fortress are still very considerable, and occupy a
commanding feite on the banks of the river Dean. In this
parish are several ancient obelisks, or stone crosses; also many
cairns. These are traditionally said to commemorate the
murdered King Malcolm II. Glammiss is divided into two
parts respectively, called the New, and the Old Town.

GLAMORGANSHIRE, the south maritime county of
South Wales, is suppos’d to have derived its name from
having afforded a temporary, though insecure, retreat to an
ancient prince, at a very early period of British history.
The story is briefly recapitulated by Spencer, in his Chroni-
cle of British kings (Fairy Queen, b. ii. c. 10.) Glamor-
gan was in succeeding ages an independent soveign prin-
cipality, disdint, as those who profess to be acquainted with
the ancient history of Wales aver, from the rule and go-
government of South Wales. The principality, or soveign
lordship of Glamorgan, as these 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 “jura regalia,” referring, how-
ever, to the subject a right of appeal to the court of the
chief lord, or, as he was term’d, 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-rooms, and occasi-
onally for dancing; an amusement still common in Glamor-
ganshire, though now beginning to decline. The ground-

floor apartments under these halls are used as almshouses for
the poor of the parish. From ancient surveys and other ac-
counts 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 hushefs of the market to
cease. 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 seen.

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 Remany, on the S. by the
Britol 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 break 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 Trevor’s History of Wales, written in the time
of Elizabeth, or in Evans’s edition of Wynne’s History of
Wales. The following abstract is taken from Malkin’s
work. Jeflin ap Gurgant, a petty prince of odious charac-
ter, waged war, in the year 1688, against Rees ap Tudor, and
was affilited by Encon ap Collwyn. Unable to make any
impression on his enemy’s dominions, Jeflin commissioned
Encon to go to England, and to procure some more pow-
ful ally. His propositions were eagerly received by Robert
Fitziawan, 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 character of treachery, by violating his agree-
ment with Encon, to whom he had promised his daughter in
marriage, as a recompense for his services. Encon, justly off-
censed, 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 all 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 differ-
ent princes at variance with Jeflin. R. Fitziawan, and his fol-
diers of fortune, availing themselves of the favourable mo-
turned their arms against their employer, who was
unprepared for so formidable a reverse, and overran the coun-
try; whilst Jeflin fared himself by flight, and died soon after
which were untreated and unavenged. Fitziawan, upon a division of
the conquered territory, took for his own share the castles of
Cardiff and Keuffig, with the market town of Cowbridge,
and the demeine 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-
cious proportions among his followers. Encon ap Collwyn,
in particular, possess’d 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
sea, mountains, valleys and rivers; and it is said to resemble
North Wales in general aspect more than any of the fix coun-
ties. Its mountains are not so high as those of Breck-
nockshire, but they present, in a considerable degree, the
appearance

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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 deserving of notice. The pointed door-ways, and pointed windows, sufficiently evince their date; and though Welsh towns are universally censured by strangers, for the negligence in the maintenance 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 barns 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 sentiency to the arts and decencies 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, Melin Gruydd, near Cardiff, where are the largest tin works in the kingdom, &c. afford another reason why the cheap comfort and elegancies of life are no longer to be sought for here.

The drefis in Glamorganshire is not so strongly marked as in some other counties, except that the women universally adopt the mantle; 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 uniformly affable, sometimes bordering on the ludicrous, particularly among the women, who are constantly seen saluting each other at market, and on the most ordinary occasions of business, as well as on occasions of diffire. 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 adorned 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 the corpse; and the hospitality of the country is no less remarkable on melancholy 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 overpoured with plucked flowers for a week or two after the funeral: the planting of graves with flowers is confined to the villages, and the poorer people. It is very common to dote 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, Cefnphilly, and Caer, which lies between Neath and Aberavon, a large balsam tree being built in the castle called Merthyr. The Colliery road was over Newton Down, leaving the present road on the right, and passes through Kenfig to Margam, and as straight as the nature of the country will admit, through Aberavon parish to Neath. Glamorganshire contains one episcopal town, viz. Llandaff, and several others, as Cardiff, the capital of the county, Cefnphilly, Llantrisant, Cowbridge, Bridgend, Neath, Merthyr-Tydvil, etc.
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and Swansea; which see respectively. The principal rivers are the Remney, the Taif, the Elwy, the Rhonhas, great and small, the Ogmore, the Cunno, the Nedd or Neath, the Tawe or Tave, and the Loughor. In this county are several rail-ways and canals. (See Canal.) The canal from Merthyr-Tyst to Cardiff was completed in 1798. From the tide-lock, where it enters Penarth harbour, up to the town of Cardiff, it is navigable for ships of 400 tons; but from Cardiff to Merthyr-Tyst, it is navigable for barges of 150 tons. The head of this canal at Merthyr-Tyst is 568 feet five inches higher than the tide-lock two miles below Cardiff, where it falls into Penarth harbour. This canal has upwards of 40 locks upon it in the space of 26 miles, which is its whole length; and it is crossed by more than 40 bridges. For an account of the bridge with one arch upon Taff; see Bridge. In a vale S. W. of Cardiff, near Duffrin house, and not far from the village of St. Nicholas, are some ancient monuments, supposed to be Druidical. The most remarkable of these monuments is a grey stone, which affames among those pieces of antiquity called Cromlechau. (See Cromlech.) This monument is supported by five large stones, enclosed entirely on the east, west, and north sides, and open to the south, forming a considerably large, though low room, 16 feet in length, 15 wide, and, at the east end, fix feet high, but only 44 at the west end. The rubblish about it prevents the investigation of its original height. The supporting stone to the north is 16 feet long; that on the west end about nine feet in length. At the eastern extremity three stones are let closely together; the middle stone is 44 feet wide, the northern stone of these three about three feet, and the southern nearly two feet in width. These stones, standing upright, support a large stone on the top, which forms the roof of this rude apartment. The length of this horizontal stone is 24 feet; it is 17 feet in its widest part, and of different breadths at other places; it is 10 feet at one extremity, and 12 about the middle; and from two feet to two and a half thick. The area of the top-stone, therefore, having for its mean breadth 13 1/2 feet, and 24 feet for its length, will contain 324 square feet; whereas it appears that it is nearly twice as large as that of the famous Cromlech near Newport in Pembrokehire. Near this cromlech are other heaps of stones called Carnco or Cairn. Of these cromleches different opinions have been entertained. Some have supposed them to be places of shelter for the Druids, who always worshipped in the open air, and after them, for the first Christian priests, in rain and other inclemencies of the weather; others have supposed them to be oratories, from the tops of which they delivered their discourses; and others again, that they were altars on which victims were offered in the times of Druidism.

Glamorganshire is divided into ten hundreds, and 118 parishes, which, in 1801, contained 71,525 inhabitants, of whom 6903 were employed in trade and manufacture, and 10,515 in agriculture. Two members are returned for Glamorganshire to the British parliament, viz. one for the county, and one for the boroughs, Cardiff, &c. Malkin's South Wales.

GLAMOUR, or GLAMER, an old term of popular superstitition in Scotland, denoting a kind of magical mist believed to be raised by forcerers, and which debaid their spectators with visions of things that had no existence, altered the appearance of things really existing, &c.

GLAN, a river of France, which runs into the Nahe, three miles E. of Sobernheim—A1lo, a river of Carinthia, which rises near Kofiber, and joins the Gurz, four miles E. of Clagenfurt.

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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 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 resemble them at all in their functions. Thus, the small bodies belonging to the lymphatic system have been called lymphatic or clogged 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 Absorbrnts and Absorption. The pincel, thyroid, and thymus glands, the renal capsules and the thymus, 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 seminiferous glands of the ear, and the febaceous glands of the face, in the head; the mammary glands in the chest; the liver, pancreas, and kidneys in the abdomen: the prostate, uterine, Cowper's glands, and glandula odonfera about the penis; and the extensive sytem of 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 just 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, secondly, 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 prehents thee 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.
G L A N D.

The former of these proceffes is nutrition or aflimilation; 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, feeks 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 aflimilated to the already existing organization in the former cafe, and applied to some other purpofe in the latter. The fubject of nutrition does not come under our notice at prefent.

The products of secretion refult from an effential 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 separate and expel their secretions from the body. The object of the secretions is, to collect those which are defigned to fulfil important ufe 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 many respects: there is in both a separation and collection of fluids. The difference consists in this, that in the former cafe the separated fluid remains in the body, while it is soon expelled in the second. Thus secretion always precedes excretion; and, in order to understand the latter, it is neceffary to know how the former takes place.

The word secretion, derived from fecernu, I separate, signifies fairly the act of separating; and its physiological import is conveyed in that notion. It denotes, in phyfiology, that function of a living body, in which various fluids, diftinguishing from the blood and from each other, are prepared from the common mafs of the blood, the fame fluid being constantly formed in the fame organ. No part of phyfiology is more obscure, and more difficult in its investigation, than this very function. Malpighi, who had bellowed great labour on the structure of the glands, and was confidered to have unveiled, in a great meafure, the mysteries of their organization, confessed his ignorance on this subject; and, as the avowal, from fuch a quarter, is interesting, we fubjoin the passages, of which the remarks here made, confemning the kidneys, apply equally to all other secretions. He fays of the urinary secretion, "quanum arte id contingat obfcurifimus: licet enim glandularem minifinum totum hos subfeqvi rationi fit confonum, quoniam tamen minima illa, simplicexque metatum in glandulis structura nos latet, ideo quaedam tantum meditari potuit, ut huic quaefe probabiliter fatisfaciamus. Necelle eft hanc machinam interna configuratione feparationis opus peragere: an vero his, quae ad humanos usus paflim uturpares, quibus fere conftitutus effigimus, confection, dubium; licet enim occurrent analoge fpongiae, incerrifici, fublimis crirbrorumque structura, cui tam in his conftitutus undequeque fit renum fabrica, difficultium eft affignare, et cum natura operando in一刀ia fecundarea fit, ejufdem ignoto nobis reperientur machina, et quas nec mente quidem assequi licet. Illud mirar tam copiosa, diversa corpora separari per has glandulas in natura fit, etiam minima aqua cum faldinis, faphture et conftitutus particulis, et ex morbo etiam afceffuum religie, et totius quandoque corporis inquinamenta separantur de tentis fanguineis particulis," &c. De Vifcerum Structura; De Resinibus, cap. 6. The whole business is carried on in the

minute, and, as we may call them, elementary parts of the viscera and glands, the structure of which eludes the research of our fenses, and can still less be developed by reaoning or reflection. Observation cannot follow the work throughout; nor does it admit of elucidation by experiment, like some other fubjeets which have been explained by artificial imitation of the proceedings of nature.

Unwilling to confefs their ignorance and leave their systems imperfect, phyfologists have attempted to raise, on hypotehesis, that structure, for which anatomy afforded no foundation. Their notions, refting merely on probabilities and loose analogies, have flourifhed and fallen in succession; and we fhall 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 conflituent parts. They poifeft, in common, all the general characters which belong to animal subftances: 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 resemblance 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 saliva, galzrie, pancreatic, feminal 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 flight. The false and imperfect notions, which were long entertained of their chemical composition, lead to classifications founded on the ufe to which they seemed to be defigned. Those employed in the nourifhment and growth of the body were called recreementitious, fuch as chyle, blood, ferum, lymph, &c. The excrementitious included those which are expelled from the body; as the urine, perfpiration, &c. A third clafs was made up of fuch as partake of the characters of both thefe; of which a part is rejected as noxious, while the reft is retained, in order to answer some particular purpofe.

Under the head of excremento-recreementitious humour, were arranged the saliva, bile, pancreatic juice, mucus of the intestines, &c. The objections to fuch 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 fo little understood, that we cannot determine whether they are expelled as noxious, or serve very useful purpofes in the economy. The bile, for example, has been very 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 reafon is the secretion of the pancreas placed in one rather than in the other of these divisions?

Pitcairne, who was followed by Micheleotti, divided the animal secretions in which has, at leaft, the merit of simplicity, and leads to no false notions concerning their ufe; he diftinguished 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. 1. The aqueous fluids. These have a very large proportion of water in their composition; hence they are distinguished by their fluidity, and have no ripoints. Fire dissipates them almost entirely, excepting a very small proportion of earthy radicals; neither alcohol nor acids coagulate them. Besides a little earth, they
they contain some fatty and oily matters. Many of our fluids belong to this division. Some are expelled from the body, and are ordinarily deemed excrementitious; such are the urine, which is not coagulable in the natural state; the inoffensive Sanctorian perspiration, and the pulmonary exhalation. Sweat is a mixed fluid, containing oily or febaceous matter, together with water. Several of the fluids, which are defined to serve particular purposes in the animal economy, contain very little except water. This is the case with the secretion of the proper salivary glands, with that of the pancreas and lacrymal gland; with the perfectly pure and transparent aqueous humour of the eye, and other watery fluids in the same organ.

2. Mucous fluids. These differ from water in being less fluid; they are tenacious, so as to adhere to solid bodies, and dry with. They mix with water, are impud and odorous, and nearly colourless. The evaporation of their aqueous parts reduces them into hard and dry cucts. Acids do not coagulate them; but alcohol has a flight effect. They yield, on distillation, a large quantity of water, volatile oil, and a carbonaceous residue. To this division belong the lubricating fluids, which are poured out over the extensive surfaces of the respiratory, digestive, urinary, and genital organs, and all the parts connected with them.

3. Gelatinous fluids, which are coagulable by heat, warm water, alcohol and acids, remain fluid below 143° Fahrenheit; and have a mild or slightly fatty taste. Haller places in this order the serum of the blood, the lymph conveyed by the arteries, the water of the amniotic, the serous exhalations of the circumscribed cavities, the lymph of the cellular substance, and the fluid of the Graafian ovula. He also places in this division the synovia of the joints, and the fluid of the tendinous sheaths, observing, at the same time, that these are partly composed of oily matters.

4. Oily fluids. These are represented by Haller as more perfectly animalized productions; they are freed from the superfluous quantity of water, and are inflammable; or at least contain much of that matter which takes fire and degrades. At their first production they contain much water, so as not to be capable of inflammation, nor to possess their peculiar character, but rather to resemble mucus or gelatine; they undergo changes afterwards, which deprive them of their aqueous parts, and render them more viscous and oily. The fat and the medullary substance of the bones, are the most extensive specimens of this order; it contains also febaceous matters of various kinds, as the greatly cutaneous matter, the Meibomian secretion of the eye-lids, that of the glass penis, and of the external organs in the female. The bile, eruct of the blood, milk, and prostatic fluid, belong to the same class.

Such are the four divisions, in which Haller has arranged the animal fluids; he observes that several, being of a mixed nature, do not belong exclusively to either class, but ought, from the diversity of their principles, to be referred to more than one; indeed there is hardly any, which can be rigorously said to consist of a single element. Then, again, many evidently contain more fluids than one, formed separately in the first instance, each in its appropriate organ, and afterwards mixed together. Thus the semen contains the secretions of the testis, prostrate, and vesicula; the sweat is made up of the water of perspiration with the cutaneous oil; the tears are a mixture of water, mucus, and febaceous matter; spittle contains water and mucus, &c.

The vast improvements in the science of chemistry since the time of Haller must necessarily have subverted the basis of the arrangement just described; which, when considered 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 has classed 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 essential changes and modifications which their elements, contained in the media of the blood, undergo in the secretory organs. Milk may be placed in the first rank, as confuting apparently of a very simple modification of chyle, and formed from the blood by a very slow 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 compound matter—including the fluids of the eye; the tears, the matter of perspiration, the exhalations in the cellular substance, and in the thoracic and abdominal cavities, to which the liquor pericardii 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 phlegmification, seem to be rather more altered. They then follow the mucous secretions, spread over the surfaces of most of the visera belonging to the nature of the generative organs, 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 febaceous matter of the skin (including also the cerumen of the ears). The grasy 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 liquor of the amnios, and the synovial fluids, are commonly deemed gelatinous; but their real nature is not yet understood, neither is that of the fluid, hitherto unnamed, thrown out in the uterus under the venereal stimulus, known. The fluid contained in the early months of conception between the chorion and amnios, that of the velica umbilicalis, and that which surrounds the veins of the umbilical chord, is as yet little understood. The contents of the Graafian vesicles, and the prostatic fluid, seem to be truly serous or albuminous. The male semen is quite a peculiar product, not to be compared to, or classed with, any other; and the same remark will hold good also of the bile." Inflit. Physiol. sect. 32.

The division of this able physiologyst would be natural and instructive, if the animal fluids deviated from the nature of chyle by gradations which could be easily perceived and marked. 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 often so many differences and so few relations between one fluid and another, that we can fearlessly compare them at all.

The vast improvements which chemistry has made of late years, and the valuable discoveries with which the analysis of
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. Fourcray 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 last great work, the "Système des Connoissances Chimiques." In proportion as the various animal products are analysed 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 impropriety 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 unnerving; and it has only served hitherto to shew 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 ascribes 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, to refer the fluids to the various organic systems in which their secretions take place, to make a class of humours for each system, to consider each of them as inseparable 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 perceptible.

Fluids of the nervous or sensitive system.

Fluid of the ventricles of the brain, Aqueous, vitreous, and crystalline humours of the eye, Tears, Meibomian secretion, Mucus of the nose, Cerumen, Fluid of the labyrinth of the ear, Saliva.

Of the muscular or moving system.

Fibrine, Serosity, Fat, Mucus of the trachea and air-veins, Fluid of the pericardium, Pleura, Pulmonary exhalation, Blood.

Of the visceral or organ of supply.

Mucous of the mouth, pharynx, and oesophagus, Stomach, Intestines, Kidney and bladder.

Gastral fluid, Pancreatic fluid, Intestinal fluid, Exhalation of the abdominal cavity, Bile, Liquor of the renal capsules, Urine.

Residue of all the fluids, and of nutrition, Lymph, Fat of the cellular tissue, Mucous fluid, Prostatic liquor, Mucus of the urethra, Vagina.

Of the lymphatic or collecting system.

Semen fluid, Exhalation of the tunica vaginalis, Contents of the ovarian vesicles, Liquor amnii, Meconium.

Of the bony or supporting system.

Gelatine, Medulla, Synovia.

Of the fluids just mentioned, some are secreted in certain organs belonging to their respective systems; e. g. those of the conglomorate glands, of the glandular viscera, &c.; others are formed over whole organic systems, without any particular apparatus, as the exhalation in the cellular membane, that of the circumscibed cavities, &c.; while others are not the produce of secretion, but more 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 classes are produced, come under our consideration in this article, but it will be described in INTEGUMENTS, 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 moistens the surfaces of the circumscibed cavities, the aqueous vapour of the lungs, and the cutaneous perspiration are formed by organic systems, composed chiefly of vascular ramifications, without possesting anything that is at all analogous to glandular structure. The arrangement of the fibrous tissue of muscles, and of the bony 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 sense all parts of the body may be called secretory or-
gans. The mucous fluids, which appear to differ more considerably from the materials in the blood, are generally separated by particular glands, which are called crypts or follicles, contained in the substance of the membranes or vilceae. But it seems probable, that these also may be separated from the vascular ramifications of a simple membranous tissu without any express glandular structure, as in the case of several mucous 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 tissu 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 substance of the liver, on the contrary, is widely different from that of the kidney; which again is very different in its character from that of the salivary glands. The glandular systen, therefore, is marked in its various parts with very few general attributes, which also fuller many exceptions.

Situation, forms, 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 mucous 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 tefficles, and even the kidneys, are so situated, as to be out of the way of such external affilience. And we observe, further, that mucus is secrated as abundantly by the pituitary membrane, as in any other part, although there is no mucous plane here; that the lining of the bladder produces an equally copious supply, when the vicus is paralytic; and that various causes augment the secretions, without any connection with the circulation first alluded to, as analagous medicines, or the fight of food in the case of salivary glands. We cannot doubt, therefore, as Bordet has observed, that this mechanical cause has nothing to do with the matter, and that the essential cause of all excretion confisits 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 resemblane 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 size; often various notches exit 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, thalamo optic, and corpora striata of corresponding size; while, on the contrary, a large liver often has a small lobulus Spigelii, and vice versâ.

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 organic. Bichat, who makes this remark, endeavours 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; if one eye, one ear, or one side of the nose 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 less subject to these variations of figure, than those which are contained in the cellular substance, without any membraneous covering, as the salivary, lacrymal, mucous glands, &c. Those of the latter description in the mouth, and along the trachea, are never alike in two subjets. The parotid sometimes is prolonged over the maffeter, and at others leaves that mufcle uncovered; varies in its breadth, &c. When either of a pair of glands is fometimes enlarged, as to be incapable of continuing its function, that on the opposite side of the body either increases in bulk, or 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 tuberculatated; it may be in contact with muscles, veflels, nerves, &c. even with bones, as in the salivary and lacrymal glands. In general, they are surrounded by less cellular tissu, than organs 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 systen into the convolute and conglomerate glands. The former name denotes the gland-like bodies belonging to the lymphatic systen, 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 poiffe nothing of a conglomerate structure; and these, accordingly, have been generally called glandular vilceae.

Organization of the Glandular System.

1. Peculiar tissu of this system.—The glandular tissu differs from most others, in poiffeing no marks whatever of a fibrous dispostion. Its component elements are not placed by the side of each other, according to longitudinal or oblique lines, as in the muscles, the fibrous systen, the bones, nerves, &c.; but they are heaped together, by a kind of confused, and, as it were, casual approximation, and adhere together but weakly. Thus, while organs, which poiffe distinct tissu, have considerable powers of reflation, 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 deprivations, which distinguishes these organs from cartilage; the rupture of which is generally smooth. The prolife, tonsils, and mucous glands relit 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 diluting force, without tearing; but this circum-

stance
face arise 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 filaments are elongated.

The glandular tissue, which anatomists have generally called parenchyma, is disposed in three different ways. 1. In the salivary, lacrymal, and pancreatic glands, which are properly called conglomerates, the organ is made of distinct portions, connected together by a loose and copious cellular texture, the intervals of which transfix vesicles and nerves. There 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 composing substance. Repeated divisions flew us smaller and smaller component portions, till we come at last to very small bodies, all conspicuous to the naked eye, and called glandular acini (grains glandulares, &c.). These component parts are flimmer in proportion to their smallness, as they are surrounded and connected to the adjoining portions by shorter and firmer cellular substance. We can easily follow the 2d, 3d, and even the 4th division of these lobes with the sepal.

The acini are of a roundish figure and pale colour, and distinguishable from anything else of a mucular nature by the absence of fibres. When examined with magnifying glasses, they are seen divided into smaller portions by cellular interlaces, 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, into the larger and succeeding lobes, in the liver and kidneis. They consist of an uniform and even tissue made up of glandular acini, closely united together into one substance. The connecting cellular structure of these particles, if there be any, is very small in quantity and short; hence the facility with which these bodies may be torn, and the kind of granulations which their rupture presents. 3. The profile, tonisls, 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 kidneis.

Controversy concerning the structure of the glandular acini.—It is easy to proceed far in analysing the composition of the glands; 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 professioning such investigations, to subject the various secretory organs to a very attentive and close examination, and endeavoured to shew the nature of the acini, into which most of the glands were ultimately resolvable. The aid of magnifying glasses, and of anatomical injections, was referred to on this occasion; but the opinions of two individuals, who had devoted much time to the subject, were completely 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.

Malpighi taught that the acini are hollow; that the arteries distributed on their surface deposit 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 deemed 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 confiding of an aggregation of such simple ones. « Glandula, qua palatino, gsthpa, intellis, et contimilas partes copiosa distantur, et omium simplicissima, et idea reliquarum glandulorum.» Hist. Vol. XVI.
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 injecting the liver and kidney, 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 Epitola de Fabrica Glandularum, ad 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. "Viserca nonpex secretohunc definita, corumqueimprimis acini, glandulare et conglomeratam, meris cum domesticis, cellulisque ope conjunctis, eo cum vinculi rebure ut convixit acini, aque ficti sociis, Laxiborium fidi fidi annexis, totus et integer deduci potest. In quolibet praecito acini, valorumquae glomeris, ex cadem fonte, ductus excretorius eff, phaseone ductuli, qui de arteriola minima, tanquam ramulis minor et fanguini imperi, decessit videre, quia in fabrica in raro continebantur, in alius quidem colis magna cum veri specie ex concealta admissit. Secretum adeo a vulgari fanguinis circuito battebus differt, quod in aliqua quidem arteriola minima cylindracea, in venas fidi aequales, aut ampliorum continetur, quae fanguinem reperire apta est, in humorum vero separatione ductus excretorius, rubro vaso arterioso minor, tanquam ramus exer vaso prodibat." 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 Thesauri. 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 shews this concerning the spine and brain, as well as in the glandular viscera. 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 prosecuted by means of magnifying glasses, injection, maceration, and corrosion, renders the conclusions, which we arrive at, in great measure, uncertain; and the parts, of which the structure is sought, are so exceedingly small, that neither opinions can be considered as clearly demonstrated, or satisfactorily refuted. The mode, in which secretion is effected, is equally obscure, whichever of the two suppositions we may adopt: neither of them solves the 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 mass 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 these 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 disquisitions; modern anatomists have judged wisely in abandoning them, and in preferring the talk of collecting facts concerning the natural and dissected structure and functions of our frame.

With such impediments, concerning the value of these pur-

fuits, we were much diverted, at observing the complacency with which Ruyfch, the great authority of the two last centuries on the structure of glands, comprehends his own doctrine, and the fancied victories with which he represents his own discoveries, as the immediate produce of a direct divine revelation. "Placuit bonitati divinae lux revelare orbis luminibus jam sensilibus. Invidi, et inimici mei lucis ridicitarum, in initio, fed Deus cui foli ornis gloria et honor, habeat benedictum potest, &c. Epitola Anat. ad v. c. H. Boer-
haave.

The organization of all the glands is by no means so uniform as to admit of our referring the mode of glandular secre-

tion to any one mechanism. The mammary gland and teflis do not resemble the texture of the organs already de-
scribed. In both of these, which again are widely different in all their feasible properties from each other, there is a vast congeries 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 pursue them, we discover nothing but minute, serpentine, and very slender tubes; which are particularly obvi-
ous in the teflis, without any trace of Malpighian or Ruyfch-
ian acini. In the breast, indeed, the existence of these bod-
ies has been a matter of dispute, and arguments, not de-
cient in plausibility, have been adduced on both sides of this important question, which, like many religious myster-
iess, is involved in just so much obscurity, as to make it a very suitable subject for polemical exercise.

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 in the root of the tongue; their figure is circular or elliptical; the cavity is lined by a thin membrane, sur-
rounded by a pulpy vascular substance, which causes a super-
ficial prominence, in the centre of which is a simple aperture, affording mucous on pressure after death.

In other instances, the membranous part is more con-
picuous, and the glandular substance less considerable, or in-
deed hardly perceptible, so that the whole seems to be form-
ed merely of membrane. These have been called crypts, 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 fibres, 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 in the surface of the part to which they belong, as the mouth, fauces, trachea, or intestines. Pressure forces the secreted mucous from the open orifice. To these clafs may be referred the glands of the lips, cheeks, epiglottis, pharynx, and eulo-
phages, thefe of the soft palate, trachea, larynx, and intest-

ines.

These more simple kinds of crypts or follicles are united in different instances, so as to compose larger masses. Sometimes they are simply contiguous, connected by loose cellular sub-
stance, and possess each its proper duct; e. g., at the back of the tongue, and about the artenoid cartilages. Such have been called glandulae congregate. In other instances, nu-
merous follicles, included in a common covering, deposit their mucous in one or more large cavities, into which several follicles open. The tomils afford an example, as have been called glandulae congregate.
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 bristles for about half an inch in length, ending by blind extremities in the cellular substance, and terminating by oblique apertures on the surfaces of the mucous membranes to which they belong. Neither acini nor round follicles can be discovered opening into such canals, which are technically named finulae 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 instances 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 insufficient to prevent us from entering into much detail concerning their organisation. The cavernous glands of the ear are small round bodies, differing in the surfaces of the cellular substance, and each of which secretes 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 sebaceous matter, in various parts of the integument, do not seem to differ essentially from these. They are round membranous cavities, with their sides covered by numerous vascular 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 flaky white thread. The areola of the nipple, the nymphse, 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 ear, possess numerous glands of this description. The Meibomian apparatus of the eye-lids is only a rather complicated specimen 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 greysih. 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 ammoniaceal matter is formed. The liver is particularly distinguished for the insipitable stench caused by its putrefaction. The kidney goes lefs rapidly into that state.

When boiled, the glandular substance produces at first a greyish substance, 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 prefont, the muscular, mucous, and cellular tissues; and lefs in the cartilaginous, tendinous, fibrous, &c. The froth produced by its boiling is of a deeper colour, and seems to contain more numerous pricks, than that derived from the white organs.

Like all other tissues, 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 corregating effects of the hot water, they do not display the elasticity which the other tissues possess at this time. A tendon or muscle in such a state, if drawn, restores itself immediately, while a slice of liver breaks. The absence of fibrous matter perhaps is the real cause of this difference. The sudden action of naked fire crisp, and corrupts 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 yields longer than the kidney, which, after two months, is reduced to a reddish pulp沉重meric in the water, while the former still preserved 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 coction 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 digestible 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 dressed 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 separate from the blood; and as these canals are only found in glands, their consideration belongs 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 they exit. Each acinus is said to have an arterial and venous, as well as an excretory tube. Arising in this way from all the interior of the gland, they soon unite together, into more considerable 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 distinctly, and with perfect separation. In some cases these separate apertures are found on a more or less distinct prominence, as in the breast, prostate, and sublingual glands. Sometimes the orifices are found in a depression, in a kind of cul-de-sac, as in the tonsils, the foramen caecum of the tongue, &c. 2. Other and more 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 produce of their secretion in a reser voir, where it is retained, in order to be expelled at particular times. Such are the kidneis, liver, and testicles. In this case there must be two excretory tubes; one to convey the secretion from the gland to the reser voir, and the other to transmit it to its final destination. These reser voirs are therefore evidently connected with the excretory tubes.
G L A N D.

Although the two first classes of glands have no reservoirs, 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 reservoirs, are habitually full of the secreted fluid. Under whatever circumstances the individual may have died, we may always produce a considerable fluid by mere pressure on the gland. The papilla of the kidney affords urine on the pressure, sections of the liver show bile in the hepatic ducts, and the testicular vesicles are full of milk, for which there is no other reservoir. From variations in the quantity of fluid, in the latter instance, the greater or less size of the breast, during suckling, entirely depends.

It appears in general that the passage of the secreted fluids in the excretory ducts is much slower than that of blood in the veins, or of lymph in the absorbing vesicles. Urine is constantly flowing through the ureters; but a much greater proportion of blood would pass through a vein of equal diameter, while the bladder was filling. The rate of motion however varies under different circumstances, the fauna is secreted 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. Where several are produced from one gland, they are very small, and sometimes scarcely perceptible. They run in a straight line, have no communications, and open immediately on quiting the gland.

2. Those which are single are larger; bearing a proportion however to the size of the gland, excepting the hepatic duct, which is manifestly very small in comparison to the bulk of the liver. They pass for some distance after quiting the gland, and are produced by the union of such tubes as belong to the last mentioned class; so that if their isolated excretory tubes were to be united together, a common single duct would be formed resembling those of this second kind. The pancreas is the only instance in which the common duct is encased in the substance of the gland; and there is no other instance, but the teeth, where it forms convolutions, so as to be much longer than the course 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 ceruminous and sebaceous glands, a'd the breast; or on the surface of mucous membranes, as the mucous, salivary, pancreatic and hepatic excretories. The skin and mucous membranes, therefore, are the only parts moistened by glandular fluids: no ducts terminate on serous or synovial surfaces. The excretories of the pretended articular glands would form an exception to this observation, if the glands existed. They never terminate in the cellular membrane; and if a communication should take place, by accident, abscesses are formed by the suppurative iritation, as in urinary fistula; or inflammation occurs in the track of the extravasated fluid, producing adhesions, which procure the cellular system from more extensive infiltration. Thus the alimentary canal may be regarded as a kind of general excretory, super-added to those of the liver and pancreas, &c., and expelling in one mass all the fluids separately poured through their respective ducts into its cavity. Indeed, all secreted fluids seem designed to be thrown out of the body. Separated from the mass of blood, they are heterogeneous to it, and do not enter the general circulation again in a state of health.

All the excretory ducts have an internal mucous membrane, which is a continuation of the cutaneous or mucous surface, on which they terminate. In addition to this they all possess an exterior substance, including the mucous canal, and differing considerably in the particular gland. It is a very thick and peculiar substance in the vas deferens: an extremely dense and close texture, resembling that of the arteries and veins in the hepatic and salivary tubes, &c. The latter is very different from ordinary cellular substance.

It does not appear that these tubes possess any membrane besides the tiliol, i.e. described, and the mucous lining. Every excretory tube possesses its blood-veils. They receive very manifest arterial branches from the renal and pancreatic arteries: the hepatic artery supplies the biliary tubes, and the Stenonian duct has its branches from the transversalis fascia. Various nerves from the ganglia accompany the blood-veils; but they never form such intricate plexuses as round the arteries.

The excretory ducts possess chiefly the vital properties of the mucous system, which has the greatest share in their formation. Their sympathies are, therefore, nearly of the same kind.

2. Of the other Systems belonging to the formation of the Glands.

Cellular substance.—Glands differ much in the proportion of this tissue, which they contain, and may be divided according into two classes. It is very abundant in the salivary organs, in the pancreas, and hepatic gland, and in all such as have a conglomerate or granulated structure and white appearance. Every gland of this class is divided into lobes very distinctly isolated by grooves filled with this texture, and determining the tuberculated surface which characterizes the exterior of the organ. Each lobule, and every glandular acinus, down to the smallest division, is covered by cellular substance: hence the whole consists of an assemblage of small distinct bodies, connected together only by the circumstance of their excretory tubes being united to form a common duct, and which we could conceive to be perfectly capable of exercising their functions if actually separate. We see this in the parotid; where small accessory portions are often seen in the course of the duct, completely unconnected with the principal gland. The submaxillary and sublingual are sometimes continuous, sometimes isolated. The cellular tissue in these glands often contains an abundance of fat. This is particularly observable in the breast, the volume of which sometimes depends on the size of the gland, sometimes on an accumulation of the adipose substance; a difference, which is very easily recognized by the touch. Hence the quantity of milk is not always in proportion to the apparent size of the mammae. In the proper conglomerate glands, however, the adipose substance seldom amounts to a very considerable quantity. The connecting threads are very short and slender in the teats. In those glands, which have a dense parenchyma, as the liver, kidney, prostate, and mucous organs, there is very little cellular tissue, and hence the facility with which some of them may be torn. Their substance never contains fat. The mucous coat 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 substituted in place of the colouring matter, which disappcears; it is not contained in cells. Fat may be seen also in the interior of the kidney, but it is round the pelvis, and not in the proper parenchyma of the gland. The tonsils, prostate, and mucous glands never contain any. Serious fluids are never thrown out in the substance of glands, which have a close parenchyma; they are not affected in cases of the most general and extensive anaemia. We cannot, however, doubt the existence of cellular tissue in such glands: necrosis demonstrates it. The fungous tumours, growing from these organs, contain much of it; and it is principally seen round the vessels, as in the capsule Chiffon. This texture, indeed, is often diffused, while the proper substance of the gland remains.

Found.
found: hence the development of inflammatory tumours in the liver, of serous cysts in the kidneys, and of hydatids in both, without the secretion being at all disturbed. The liver is sometimes surrounded by three or four fold by internal tumours, without its proper tissue being augmented: the latter forms a kind of capa between the swellings in which the biliary secretion goes on.

Blood-vessels.—Glands, which are not surrounded by a membrane, receive their arteries from all quarters. An abundance of small branches from the neighbouring trunks penetrates the surface of the salivary and lacrimal glands, the pancreas, &c. They first run between the lobes, penetrate into the smaller divisions, and are finally dispersed on the acini. The branches coming from different quarters anastomose freely in the gland.

Where the organ is surrounded by a membrane, as in the liver, kidney, salivary, &c., the arteries penetrate on one side only, 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. The part, at which the artery enters, is always the farthest removed from the action of external bodies; a remark, which is common to all important organs, as the lungs, intestines, spleen, &c. The convex surface of the liver, where the vessels are the smallest, and where hemorrhage would consequently be attended with the least danger, is always turned upwards. 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 these organs is to inject them with hard injection, and to destroy the animal substance by means of immersion in muriatic or nitric acids: a part 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.

Rufch, 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, so as to form, through the whole substance of the organ, small granular bodies less than a pin's head, which are the anastomosis already alluded to. The surface of the liver is covered, after a successful injection, with innumerable capillaries arranged in a fluted form, and giving the appearance of little tufts of minute arteries, when the part is corroded, which have been compared to camel's hair pencils; and this arrangement has been termed the penicillus. A similar disposition is observable in the spleen.

Some have conceived that the large arterial trunks of glands comunicate 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 spermatic artery is a remarkable exception to this observation, and the flow of the seminal secretion has been explained from this cause. We own that we cannot discover any very convincing arguments in proof of these opinions.

The veins accompany the arteries throughout, in their distribution to the glands; we have no distinction here of a superficial and deep seated set. The liver is the only exam.

ple 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 system. The conglomeration glands contain very little. It imports no small to these organs, which are whith in their appearance, and only require the water to be changed two or three times in one hour. 2. The mucous glands, profuse, and teedle contain a large quantity. 3. The liver and kidney have such a considerable portion, that they differ widely 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 consider these organs, it is necessary to renew the water at least twelve times before it ceases to be bloody; when we prefer them in alcohol, previous maceration is necessary, to prevent the spirit from becoming turbid by the blood. This large quantity of blood occasions the glands now under consideration to be heavier than the other parts of the sympathetum; hence, too, erites their distinguishing red color, which is not more essentially inherent in their tissue, than in mucous surfaces or mucus: in fact repeated washings will discharge it as effectually. The liver then exhibits a greyish appearance, which appears to be the proper colour of its tissue, as white is that of the muscular tissue. The appearance of the kidney seems to be less immediately influenced by the blood. It retains a degree of redness after frequent renewals of the macerating water; and the pulp produced by leaving it in water for some months, with frequent changes, still has a red tint, although less deep than in the recent state. Does the state of the secretion influence the quantity of blood contained in glandular organs? Is there more blood sent to the kidney, when the urinary fluid is separated abundantly, than when it passes off slowly? or is there less returned by the veins in the former case?

Nerves.—Glands receive two kinds of nerves. 1. The lacrimal and salivary glands, the tonsils, &c. are supplied almost exclusively from the cerebral nerves. 2. The salivary, profuse, 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 remarks apply to those 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 ganglion, and very manifest in the larger organs, as the liver and kidney, where the plexuses come from the semilunar ganglion, in the salivary glands, where it is derived from the superior cervical, in the testis 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 traverse these organs, leaving a few branches behind them. But the liver obviously poleusses 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 odd 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 these organs.

We know but little of the exhaline and absorbing vessels in the substance of glands, where they are merely subervient to the purposes of nutrition.


1. Properties derived from their Organization.—These are
very slightly marked in this system, 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 parts 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 diffusion and contraction, than those which are made up of fibres. Where the liver contains a large quantity of blood after death, in consequence of the venous system being overloaded, its bulk remains the same; its fibres are compressed by the weight. The enlargement of the vesicle in gonorhea, 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 cited 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 structure 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, salivary, 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, salivary 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 glands, in the inanimate of the cutaneous apparatus, and by a glandular vein in the caudal of the kidney: mucous is secreted by mucous membranes, and by different kinds of glands; and lastly, oily matter is poured from the arteries of the cellular membrane, from various subcutaneous glands, from the vessels of the skin, from the liver, &c. Again, there are instances in the body, of organs, which we should, a 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 pedicillaries, which is seen also in the liver, and considered to have much connection with the peculiar functions of the secretory 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 points decisively. To the chapter in which these details are contained, he prefixes this sentence: "Suce quidem humor per quodunque columna separat, et the cases which he cites, fully justify his concluding paragraph: "Quando hac exempla repetemus, constabat, non ejusdem unice chartis diversos hodie, tabulae colli communia, sed utam per muci organi aequum, per mucis squamosula, et adipsa colli lymphem et tiglonem, per aqua, mucis et lymphem suis adips, bene lugubrum, fecundum atque adaequandum, nullum in animato corpore separato organis efferre, quod non omnium chilidum hominum suis cum dotibus fecercere quidem." Element. Physiolog. lib. iv. cap. 1, sect. 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 flows 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 afford us, and shall mention the opinions which have been most prevalent on the subject. It will be an easier task to shew how unsatisfactory most of these are, than to substitute any thing more rational in their place. We proceed to point out the vital properties of the glands.

No part of the system possesses 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 vesicle, 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 system in general, but his statement is not perfectly explicit: "Universe glandulae experiemini minime irritabilis videntur, neque vehementer aut morbosos fictuant, aut illata professores 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 system; it is generally acute and heavy.

Properties of the organic life.—Sensible organic contractility does not exist in the glandular system; 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 veins of blood those materials which are fitted 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 excretions. From this common reservoir each gland draws what is requisite for its secretion, each organ for its nutrition, and every fleshy surface for its excretion. 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 constant, 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 feeding properties; of those which constitute the peculiar life of the part. Observation proves this; we see these properties, when augmented or diminished, producing on one side increased secretion, as in diabetes, mercurial salivation, cholera morbus, &c.; on the other, a decrease 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 suppression of urine, dry state of the mouth, &c. On other occasions the nature of the glandular sensibility is changed, and it harmonizes with substances 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 well known. The saliva is less liable to change; but how different is it in many diseases from its ordinary condition. Nothing can less resemble urine or bile than the fluids often discharged from the bladder and liver; whence these differences? From the variations in the organic sensibility bringing the part into a relation with these substances, which were foreign to it in the 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 so far as to allow that the kidney, by assuming a sensibility analogous to that of the liver, may actually form bile? why should it not secrete bile, if it does secrete other fluids so widely different from the urine?

In the healthy state, the mode of sensibility in each gland is nearly uniform; and the secreted fluid is consequently 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 transform the principles which colour the urine, and that fluid is consequently discharges 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 saliva is discharged from the mouth in abundance; as the attack goes off, the salivary secretion returns to its natural state.

The various changes in the organic sensibility, and the sensible contractility 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 dissecting rooms, the numerous diseases observed in this part of the body compared to others. The glands, the skin, the mucous, venous, and cellular system, hold the first rank in this respect; and in all these 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 reiterate in the capillary system, as exhalation, abstraction, 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 possesting peculiar vital properties, which, when variously modified under particular circumstances, enable the organ to separate 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 same plant, and reasoners 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 conglomerate in their structure; and a fluid, exactly resembling the pancreatic of warm-blooded animals is formed by the tubular pyloric appendages, variously constituted in different genera of fishes.

Of the different explanations, by which physiologists have successively attempted to elucidate the function of secretion, most are completely hypothetical and improbable. In most instances it has been affirmed that the various animal fluids are 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 stratified varieties in the walls 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 filters, filters, and strainers, so frequently employed in physiology. We are dispelled 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 analyses of the blood have no longer even the shadow of an excuse for regarding this fluid as a mixture of all the animal liquids, 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 muscular, membrane, and nervous; but none of these modifications of animal substance are contained in it perfectly formed.

Their precipitation, says Pouvarot, in the tubes 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 cerebral 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 membranes thin; the mucular fibre is not completely identical in its character with that which exists in the blood; and the phosphat of lime is not assimilated in the latter to the gelatine substance, which unites its parts.
cles in the bony system. Hence secretion always implies some change or modification in the matter which results from its exercise. Commoill, Chir. sect. 8, ord. 4, art. 5.

Another notion, as distinct of all solid foundation as the former, is, that the blood undergoes certain changes as it arrives at the glands; that it affixes a peculiar composition before it penetrates the organ. It has been asserted that the blood-vessels are so arranged as to produce particular modifications in the contained fluid, and that this is a disposition 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 those which carry blood or white fluids, the different temperatures supposed to depend on these proportions, in a word, all those points of organization 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 disposition favourable to the formation of saliva in the neighbourhood of the salivary glands, or urine in that of the kidney, &c. This disposition, depending on the vascular apparatus, has been represented to consist particularly in a retardation, acceleration, cooling or warming of the blood, or in the loss, by absorption, of some of its principles. But what feasible cause can produce these effects? Does not the blood flow through the trunks which are going to the glands just as in other vessels? In short, what is the change? The supposition in question is a complete assumption; not supported by a single fact, and contrary to observation as far as our knowledge hitherto extends. For we can detect no difference in the blood drawn from the carotid, spermatic, hepatic or renal arteries. We have been surprised to find this opinion adopted and supported by Proucroy; but the whole of his remarks on the subject in the "Système des Connoissances Chimiques," sect. 8, ord. 4, art. 5, do not contain a single proof, and afford an example of vague and entirely illogical statements. We do not mean to deny that there may be particular conditions of the whole mass of blood favourable to certain secretions. Thus, after drinking copiously of watery fluids, we find a much larger portion of urine secreted; and the cutaneous exhalation is often augmented from the same cause.

In our endeavours to discover the mechanism of secretion, it will be best for us to select the most simple mode of this function. Now the exhalation from ferous membranes, and the mucous fluid covering the surface of most cavities in the body, are examples of this kind. We can discover nothing in these organs but vascular ramifications united by cellularsubstance. Injected fluids in the dead body follow the same route which the secreted liquors follow in the living state. And the same observation may be applied also to the case of secretions in some of the more complex infusions. "Water," says Haller, "tinted with colouring matter, fluid film, or oil of turpentine, thrown into the arteries of a young subject, and occasionally even fuel, in the experiments of Raync and Albinus, have excited in numerous small drops from the skin, after the removal of the cuticle in warm water, so as to imitate very closely the proceedings of nature. I have also repeatedly seen water, coloured with blue, and injected into the lungs through the interior cava, run out with much froth from the trachea. In the kidney, water, air, or fuel will pass through excretory tubes continuous with the arteries into the infundibula and pelvis. Oil of turpentine and quicksilver have passed into the chamber of the aqueous humour from the arteries: in the same way injected water imitates the course of the tear, and exudes abundantly from the whole internal surface of the eyelids." Memo. Physiol. t. 2, p. 374. Physiologists have indulged in considerable disputes concerning this kind of secretions. "Some," says Blumenbach, "affirm that all separation of fluids from the mass of blood is accomplished merely by pores in the blood-vessels, and that, as they say, of an inorganic nature; while others deny altogether the existence of secretory pores. I suspect that this difference of opinion need be resolved into a verbal difference. On the one hand, I must confess, unequivocally, that I know not what notion to form of inorganic pores in an organized body, since all the openings in such bodies 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 vesicles: since it is probable that the separation of fluids depends more on the vital properties than on the forms of the secretory organs." Inst. 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.

Those, 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 stress even in the present day. This refers the difference of the secreted matters to the peculiar arrangements of the minute arteries of the glands. Ruyfch, who excelled 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 desideratum; for the question concerns the very smallest capillaries, from which the tubes conveying the new product commence. Now the larger ramifications, such, for instance, as will admit several globules, 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 cerebr. of the liver, 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 blood-vessels may be seen in various membranes which produce the same kind of exhalation.

Recover has been had to the science of chemistry, in order to explain the function of secretion, but no affinity has been
hitherto derived from this source in unfolding the mystery. That the changes, by which the new products constituting 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 can neither detect the nature, nor appreciate the force. If, however, we cannot be very sanguine 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 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 substantia 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 emollient artery and vein separately, and ascertaining precisely in what particulars they differ from each other. 


Fourthly, 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. 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.


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 a priori that the effects of their operation will be very obvious; but the laws, which regulate this matter, are litherto 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. As I divided,” says Bichat, “the nerves of the trachea in a fowal; 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 paralytic limbs may inflame and suppurate. Erection and evolution of the femur may occur, when the lower part of the body is paralyzed; and when the nerves of the prostate at least must have entirely lost their influence. An example was related to me of a soldier, who contracted a gonorrhoea in this state. In complete paralysis of the bladder, mucus is still secreted in sufficient abundance. The noril 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

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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-veils are equally full of mucus on that side. In the convulsed state of such parts as pofts glands, where the nerves of these organs must consequently be unusefully excited, there is no augmentation of the secretion.” Anatomic Generale. tom. 4. p. 604. We may observe further, that when the influence of the brain on the organs of the animal life is completely suspended in apoplexy or convulsion, where fection 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 lacrimal 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; distressing 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 asserted, 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 Bergey conceives that the tone of the secretory organs was kept up by the nervous fluid; De Natura Humana. p. 122. Quennay referred the differences of the secreted fluids to various degrees of sensibility in the secretory vessels. L'Environ. Anim. t. 3. p. 437. De Bordeus ascribed great influence to the nerves on the secreting arteries; Recherches sur les Glandes. p. 532. Stahl and his followers, who ascribed the power of guiding the vital motions to the soul (anima), conceived that it governed the functions of secretion also; and A. F. Hoffman ascribed the difference of the fluids entirely to the anima, which regulates the secretory orifices by sphincters 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. Physiol. 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 influence of nerves; and that balsams, ointments, gums, and coloured milky fluid is formed from the common liquid 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 can we 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 these surfaces which secrete it; and the slightest irritation of the conjunctiva increases the secretion of
of the biliary gland. The presence of food in the mouth excites the salivary organs; and the act of suckling or milking produces a secretion of milk, &c. &c.

The same powers by which secretion is effected accomplish the passage of the fluid, when produced, through its respective tubes; it is the sensible organic contrariety by which this is effected. Experiments on the ducts of glands in living animals, show that they are not affected by chemical or mechanical irritation, and hence many have concluded that they possess no power of contraction; but the phenomena 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 prelapses and extraneous influence of other kinds have been resort to, in order to account for the expulsion of the fluids contained in excretery tubes, on the idea that these canals possess no contractible powers in themselves. Such explanations are quite gratuitous assumptions in all cases; 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 definition; but is either retained in the excretery tubes, or kept in particular resevoirs; and it has been supposed that various changes take place in its nature and properties under these circumstances. "Frequent urines," says Haller, "are mechana ou natura urinar, ut humorem seque pertinere, persecut, ad determinant. Hahs contemperz, legitima occasione effundat." Elen. Physiol. t. ii. p. 155. The urinary and gall-bladders are the most remarkable instances of this description: we may mention also the vesicular 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 case will be considered in the account of the various organs. The opinions entertained concerning the general effects of these resevoirs, are, that the fluids are impregnated by an adsorption of these aqueous parts, that they are depurated, or rendered more perfect, and variously mixed together; it is added, that their retention in the heat of the living animal body in many instances renders them acrimonious, and that this change, in many cases, as in the bile and feamen, promotes the views of nature. These notions are not very consonant with each other, nor very clear in themselves; the latter hypothesis, 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 reduced 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 absorbers; 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 essential 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, the bile taken from other dogs opened at the same time. During the first days they appeared weary, did not eat, were very thirsty, 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 often employed human bile in similar experiments; the results were the same, except that hicouche 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 cases. 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 ill-necess was more severe, but one animal only died, and I suspect that this fatal event happened from the unguarded introduction of a little air at the time of the experiment." Anatomie Generale, t. 4. p. 858. 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 system, as, for instance, into the crural artery.

Sympathies of the glandular system—These may be divided into the passive and active. The glandular tissue is very readily influenced by various excitements, either in the natural state, or in different, 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 excretery 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 iritation 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 for the purpose of producing 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 matters of most varying consistence, thickened, and colour; and this occurs from sympathy with various states of the stomach. The liver, kidney, and pancreas are influenced in very numerous ways; wherever any organ in the animal economy is affected, these are deranged; their secretion is increased, diminished, or altered, and frequently even inflammation and suppuration supervene. 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, so as to produce various appearances of the eyes. Weeping in various mental affections is another example of sympathetic influence. The teardrops and prolate exhibit fewer instances 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 sequel of consideruble acute chills, particularly fevers, the action of the glands is often considerably 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
preceeding clas: but diseases exhibit influence of them. inflammations of the liver, kidney, salivary systen, &c. new various phenomena produced sympathetically in other systen.

Bichat, in his Anatomie Generale, gives the following view of the characters which distinguish the vital properties of the glandular system.

1. Peculiar vitality (vita propria) of each gland — The vitality of the glands, resulting from the preceding powers combined in a state of action, is not uniform in the whole system; because the structure varies in every instance, and each tissue possesses a particular modification of vitality. Hence refult many phenomena noticed by Bichet.

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 cachetaries 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 fleshes, the uterus and breasts affect each other, &c. 3. Each glandular inflammation has a peculiar character: that of the inflamed prostate has very different symptoms from the tooth in such a condition. 4. Every gland has peculiar difeases, or fome at least to which it is more exposed than others. Hydatids, which are very common in the liver, are never seen in the salivary glands or saccus. Sarcocole is extremely common, while nothing is more unfrequent than an enlarged parotid. The liver alone exhibits that peculiar alteration, which constitutes the fatty state; and is the moft frequent of all feptic tumours. Physicians, who have not been converfant with the inspection of morbid eaxes, use the vague and insignificant terms of obftrufion and induration for every kind of glandular enlargement. The increafe of fire is the only common character of fuch affections, while the nature of the tumour is entirely different. 5. Every gland presents fome peculiar modifications in what are called the chronic eruations, occasionally confequent on acute difeases. 6. The different vitality of the glands occasions them to re-act at very different intervals, in confequence of direct irritation, or sympathtic excitation. The lacrymal gland, for example, pours out suddenly an abundant fecretion, when irritated; while the kidneys or pancreas can be excited only very slowly.

2d Character. Inactive state of the vital powers. — The glands are fubjeét to habitual alternations of increafed and diminifhed action. The animal functions are especially influenced by sleep, which completely fuppreds them. The action of the glands is only partially diminifhed at certain times, except in fleep, when it is sometimes completely fuppressed. Bichet compares the fleep of the animal life to the intervals of intermittent fevers, where the apetite is complete; and the fleep of the glands to that of remittent fevers, where the symptoms are merely diminished in degree. Salvia flows into the mouth abundantly during malnutrition; it merely moistens the cavity at other times. The pancreas and liver pour out their fecretions profusely, while the food is in the duodenum: they act much less intenfly during the state of abstinence. The kidney is particularly excited fome little time after a meal. The intermitting in the action of the fluids are almost as complete as theofe of the organs of animal life. Every mucous gland has its particular period of fecretion: it is, when the surface, on which the duct opens, is in contact with any subsance either retained in the cavity, or paffing through it. We muft, 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 confequently furnish a more abundant supply.

This remittance of the glandular action, says Bichet, depends on a caufe analogous to that of sleep, which arises, in the animal life, from the fatigue experienced by the organs of sensation and locomotion, after a continuance of action. The latitude, of which the glands are infusceptible, is not generally marked by any painful feeling; yet there is in the bread, after long fuffering, a kind of dragging sensation, and actual pain is felt in the teeth after emission has been repeated two or three times.

3d Character. — The vitality of the glands is never extinguished at the fame time in the whole system. When one is in action, the others are in a state of remission. We might conceive, fays Bichet, that there is only a determinate quantity of vital powers for the whole, and that one cannot be exercised unanimously without a corresponding diminution in the ref]. The digestive apparatus is accommodated to this law. At fift the salivary fystem produces an abundant fecretion; then the fomach comes into action; thirdly, when the chyme enters the duodenum, the liver and pancreas are principally excited; at the fourth period, the mucous glands of the large intestine act; and laftly, the kidney exercises its peculiar office to evacuate the refuse 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 moft improper time for coercion is during digestion, because the mucous, pancreatic, hepatic fecretions, &c. muff then be performed at the fame time with that of the tefticle. In difeases, the fecretion of one gland is extinguished at the expense of others. This character of the glandular fystem is only an example of the general character belonging to all the vital powers, by which, when increafed at one point, they are proportionally diminished in the other fation. Hence large abscesses, confequent tumours, and dropsies are always attended with debility of the glandular action. On the fame principle is founded the use of blisters, feetons, moxa, cauteries, &c. which do not act, as old physicians fuppofed, by evacuating any morbid matters, but by putting an end to the irritation in the difeased part, by means of that which they determine in some other organ.

4th Character.— Influence of climate and the feasons on the vitality of the glands. From the preceding character is derived another phenomenon, which may be considered peculiar to the glandular fystem: 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 fame fluid, introduced into the body, is expelled in winter by the skin, in summer 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 subervient to digestion, the lacrymal and urinary fecretions, &c. the two sexes exhibit very little difference. In the generative fystem, the male produces the addition of tefticles 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 fecretions
GLA

GLA

vations possess very little activity in the fetus, the glands in
general are large. The salivary glands and pancreas are
larger than in the sequel; the bulk of the liver is enormous;
and the kidneys considerably exceed their adult volume.
It is not yet ascertained whether the same observation ap-
pplies to the mucous glands. The form and colour are dif-
different in several from what they afterwards exhibit. The
texture partakes of that softness and delicacy, which are
common to the whole body; and they abound with fluids.
In respect of their secretions, they seem to be in a con-
dition analogous to that of remission in the adult; indeed,
they produce still less than at that time. In fact, all the re-
servors would not suffice to contain the produce of their se-
cretion, if these were as much produced in a given time, as
after birth. Is this because the black blood, which they
contain, does not furnish suitable materials, or rather, be-
cause the actions concerned in the composition of the body
predominate so remarkably over those of the other kind?
All the matter brought to the organs remains in them, and
affords the materials of the rapid growth, which is then
taking place; consequently, the secretions, which are de-
digned chiefly to get rid of the refuse of nutrition, are
then inactive. Moreover, digestion introduces into the
blood none of those principles, which, not being required
for nutrition, are expelled nearly as they enter, without
having belonged to the composition of the organs; such as
the greatest part of the drink.

2. State of the glands during growth.—This system ac-
quires a sudden increase of energy at the time of birth.
Red blood now circulates through its vessels; and the ex-
trinsics of the excretories are stimulated in various ways,
as, by the food in the cafe of those which open on the al-
imentary canal, by the air in the respiratory apparatus, &c.
The organs are so much the more sensitive to this sudden
excitation, in proportion as they were before unacquainted
with it. Yet many of the secretions are carried on with less
activity during the first years of life, than in the sequel, as
those of the salivary glands, liver, &c. Affections of the
glomerular system are not the leading ones in the first years
of life. The lymphatic glands, as they are called, and not
the parotids, form the swellings so frequent about the neck.
Hepatic affections are rare at this time. All the secretions
connected with the generative process hitherto do not exist.
The organs, which are particularly employed at any age,
are chiefly affected by acute and chronic diseases at that
time; while those, by which no important function is ex-
ercised, seem to be overlooked. All affections of the testis
and chord are unfrequent before puberty, while the process
of nutrition alone is carried on in these organs. The glan-
dular tissue is for a long time soft and delicate in the child;
and it has not that property of becoming hard in con-
sequence of boiling, which we have mentioned as belonging
to it in the adult.

3. State of the system after growth.—We have already
spoken, in the article GENERATION, of the organs which
come into activity at puberty, and of the influence which
they exert on the frame. At this time all the system ac-
quires a greater firmness in its texture. Towards the for-
tieth year the digestive glands seem to be predominant in
the economy, and the liver is especially observable among
those. Now bilious affections are most numerous; and the
influence of those passions, to which the bilious tempera-
ment seems to difpofe, is most observable.

4. State of the glands in old age.—At this time the organs
gradually become more hard in their texture; but their col-
cour changes les than that of most parts. The liver, kid
ey, &c. are nearly as full of blood as in the adult;
while the mucus, pale and colourless, contain a smaller
proportion than before. It seems that this fluid first quits
the skin and mucus, which are far from the heart, and
is concentrated in the nearer organs; thus the secretions are
still abundant in old perons, while the muscular and nervous
powers are considerably weakened. The kidneys and liver
still separate their particular secretions in large quantity.
The activity of the generative system has long ceased. The
active exertion of the glands which are thus employed may
be referred to two causes. The decomposition of the body
is very marked at this time, and much matter is consequently
thrown out by certain glands. The decay of the old sub-
ject is a phenomenon exactly opposite to that of growth in
the fetus. The skin, shrivelled and hardened, ceases to
throw out the products of decomposition, and the glands
supply its place.

Generally speaking, life ceases most gradually in the
glomerular system. In the bodies of old persons we see the
gall and the urinary bladders still full of their respective
fluids. Compression of any gland, even of the prostate,
shows that it contains much fluid; even more than we ob-
serve in the young subject. It is also a remarkable pheno-
menon that all the chief internal organs, as the liver, kidney,
heart, lungs, &c. still preserve a considerable share of vi-
ability, while the parts subjacent to the stomach and small
bowels are nearly exhausted, and the ties, which connect the
individual to surrounding objects, are consequently nearly
destroyed. Haller, Element. Physiolog. tom. 2. Dumas,
Principes de Physiologie, t. 4. Bichat, Anatomie Gene-
rale, t. 4.

GLAND, in VEGETABLE PHYSIOLOGY, (gladiola, a little kernel)

defined by LINNAEUS as a "small tumour, discharging a
fluid." This fluid is always some peculiar secretion. The
calyx and flanks of the Mofs Roe, and of many other
Roes in some degree, are covered with prominent glands,
discharging a virfud aromatic liquor. Between the flanks of
the leaf of SALIS pamandra, the Bay-leaved Willow, is a
series of such glands, whose exudation is a highly fragrant
yellow gum-resin, to which the fine-rect of that leaf is
chiefly owing, and several other Willows are provided with
similar, though less perfumed, secretions. On the footstalks
of the Guelder-rofe, Viburnum Opulus, are very large and
elaborate glands, whose discharge however is comparatively
trilling, while various Species of Paffion-flower bear cup-
shaped glands, on their footstalks, producing a considerable
quantity of very sweet honey. These therefore bear more
analogy to those glands, appropriated to some flowers, and
called, from their produce, nectariferous glands, or nec-
taries. Such occur in GERANiUM, and in the Cruci-form plants,
constituting the Linnaean class TRichodynia. In the latter
the nectariferous glands occasionally exhale a powerful
scent, especially in SyphiIum tenuifolium, Eng. Bot. t. 525.

The kinds of glands above-menioned, being of a secre-
tory nature, certainly bear a great analogy to the glands
of the animal body; but it appears that the more general
and important secretions of vegetables are accomplished
through membranes, whose organization and physiolog are
inertible to our powers of investigation. S.

GLANDS, DISFECTED. See BEBO, LUES VENERAB,
SCHOPPEI, BRONCIOEL, &c.

GLANDS OF BIRDS AND FISHES. — See Anatomy of Birds, and
FISH.

GLANDEN, in Geography, a town of Prussia, in Na-
tangen; 30 miles E. of Brandenburg.

GLANDERS, in Veterinary Science, a filthy disease in
a horse, so called, probably, from the swelling of the sub-
maxillary glands that accompanies it; and consisting in a

corrupt
corrupt slimy matter, running from the nose, of a different colour, according to the degree of the malignity, or as the infection 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 so long standing, that the matter is of a blackish colour, which is usually in its last stage, they suppose it to come from the spine; and hence they call it the warning of the death.

Kernels and knots are usually felt under the caud in this disorder; and as these grow bigger and more inflamed, to the glands increase more. The progres of the disease is extremely uncertain; as some horses will endure it for many years, without any other obvious inconvience than a slight discharge and the enlargement of the glands under the jaws; and instances 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 cartilages of the nose are speedily eroded by the malignity of the ulcer, from which an abscission commences, and conveys the poison into the circulation, gradually and fatally contaminating the whole frame. Neither the appetite nor the condition of the glandered horse suffers materially in the early or mild stage of the complaint. When, however, it has fixed its dominion over the thoracic viscera, forming ulcers in the substance of the lungs and in the waist-pipe, great pain and difficulty of respiration are experienced, the discharge becomes very 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 dissolution.

M. La Foffe, farrier to the King of France, has taken great pains, by repeated dissections, to discover the source and cause of this disorder, and to ascertain the proper and effectual method of cure. He has distinguished seven different kind of glanders, four of which are incurable. The first proceeds from ulcerated lungs, the purulent matter of which comes up the trachea, and is discharged through the nostrils, like a whitish liquor, appearing sometimes in lumps and grumes; the second is a watery humour, that usually seizes horses at the decline of a disease caused by too hard labour, and proceeds from the lungs: the third is a maliglant discharge, which sometimes attends the pleasure, falls upon the lungs, and is discharged at the nostrils: the fourth is when an acrimonious humour in the farcy seizes these parts: the fifth arises from a horse's taking cold; the sixth is a discharge from the sinuses, which sometimes vents itself at the nostrils: the seventh, or real glanders, is that above described.

M. La Foffe, after examining, by dissection, the carcase of glandered horses, and making a strict scrutiny into the state of the viscera, affixed 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 purulent membrane which lines the partition along the inside of the nose, the maxillary sinuses or cavities of the cheek-bones on each side of the nose, and the frontal sinuses or cavities above the orbits of the eyes; that the viscera, as the liver, lungs, &c. of glandered horses are, in general, very found; and, therefore, that the seat of the disorder is not in those parts, as many authors have affted.

He found these cavities more or less filled with a viscid slimy matter: the membrane, which lines both them and the nostrils, inflamed, thickened, and corroded with forbid ulcers, which, in some cases, had eaten into the bones. He observes, 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 disfigured; and if one gland only was affected 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 resembles a disorder in men, called abscess.

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, fetid, and of an ablab colour; these symptoms are very unfavourable: 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 expected. The cure of the milder kind of glanders may first be attempted by injections and fumigations. When these latter symptoms appear, the horse should first be bled, and treated as in the common disorder of cold; and then, let an emollient injection, prepared with a decoction of linden, marsh-mallows, elder, chamomile flowers, and honey of roses, 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 refraining injection may be prepared with treacle of roses, honey-water, &c. and the nostrils fumigated with the powders of frankincense, mastic, amber, and chambar, burnt on an iron heated for that purpose, the fumes of which may easily be conveyed through a tube into the nostrils. When the disease is irrevocable, recourse must be had to the operation of trepanning, which M. La Foffe performed on three horses, two of which discharged from one nostril only, and the third from both: he trepanned the two hell 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 inconvenience from the operation. The method of performing this operation will be understood by means of Plate XIX. “Illustrations,” fig. 1, and the following explication: 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 sinus, terminating between the lines D and E, where appears a subabundance in the form of a pear, which is the os ethmoidis, or sieve-like bone through which the olfactory nerves pass, communicating sensibility to the pituitary membrane. E represents the beginning of the maxillary sinus, terminating at M: the shaded space between these lines represents the great cavities. F is a bony partition, separating this sinus into two parts that have no communication: of which partitions there are sometimes two, represented by F and G. Some horses have neither of these. N shows the place of the canals or horns; O, the doubting; 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 leptomarium, dividing the nose from top to bottom, and separating the two nostrils. I, shows the place where the trepan should be applied, when there is reason to apprehend that the glanders is spread to the frontal sinus; E is the place where it should be applied.
to cleanse the maxillary fissus, 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. It flows 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 represents 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 held close. If there should be two holes in the maxillary fissus, it is absolutely necessary to pierce through both, with a filletto or sharp-pointed tack, as in the figure. The trochan should be directed towards the interior part of the nose, to continue being obstructed by the roots of the teeth. R is the trochan, S the handle which turns it, and T the few-part to be applied to the bone. The surgeon's trephine will suffer the purpose for this operation; but 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 hold a pint of injection. The injection first used should be of a different nature, as a decoction of birth-wort, gentian, and centaury, to a quart of which may be added two ounces of Egyptianum and tincture of myrrh; and when the discharge abates, and the matter becomes of a thick consistence and white colour, this injection may be changed for barley-water, honey of roes, and tincture of myrrh; and for completing the cure, Bates's alum-water, or a solution of colocynth, vitriol, lapis medicamentosus, and such like, in line-water, will serve to dry up the moisture, and to relieve the tone of the relaxed glands. For this purpose Dr. Bracken recommends the following mixture: Take of alum and white vitriol powdered, of each four ounces; calcine them in a crucible; when cold, powder the cakes, and mix it with a gallon of line-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 fixture, 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 cautery. The cure will be expedited, by giving every day a quart or three pints of a strong decoction of gualacum chips, by purging at proper intervals, and putting a rowel into the horse's chest; and if these fail, mercerials may be administered with the physic, and the alternative 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 scalded bran; then blow up his nostrils as much as possible, in fine powder, as will lie on a fixed-pence, evening and morning, giving him for drink small line-water, during four or five days; then boil two ounces of elecampane 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 masts that grows on oaken pales, in two quarts of milk, till one is cowed; strain it and squeeze the masts, and give the milk half 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 take four 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, fastening the threads to the top of his head, to prevent their dropping out; ride him an hour or two morning and evening, 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 frcb 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 veterinarian'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 the successes attending it has been 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 utmost 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 their in some cases 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, whilst 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 male and the afes, 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. Diffusion of the horse after three months' trial showed no disease in the brain, but it was altogether confined to the fentum 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 cold, there is generally a
GLANDULA, in Anatomy, the name as gland.

The word is a diminutive of the Latin glans, acorn; and is here used on account of some external relation between the glands of the body and the fruit of the oak.

GLANDULA Glandis, among Surgeons, is a tumor resembling a gland; soft, lumpy, movable, with roots, and separate from the adjacent parts.

GLANDUS, as in Anatomy, a name sometimes given to an excrecence near the anus.

GLANDULOSUS, 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 Ruyfch, 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 carp glanulosus, or glandulatus flesh.

Glandosus Divus, glandulosum corpus, more particularly denotes the profite.

Glandulosus Roots, among Botanists, such tuberous roots as are affiliated together in large numbers by small fibres or threads.

GLANIS, in Ichthyology, a species of Silurus, which fe.

GLANOVENTA, in Ancient Geography, a place of Britain, in the 10th Iter of Antoninus, inpitoted by Horfley to be Lancaster, in the county of Durham.

GLANS, 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 forepart bare. See Acorns and Oak.

GLANS Marina, a name given to a genus of shell-fish, more usually called Lutum, and in English the centre shell.

GLANSE, as in Anatomy, a name given by Guigner, and some of the Physicians, to a kind of figured shell, found usually among the trochitide and entrichi, and evidently appearing to have in some manner belonged to them. All the writers, who have these bones examined, are the names of glanses trochiliformes, others under less determine etes. Agricola.
calls them lapides informes; and Lifter, after him, rude stones, having impressions of the entrench. See farther Philosophical Trans. No. 100.

GLAS Palus, in Anatomy, the rounded extremity of the organ. See Generation, organ of.

GLASHAMMAR, in Geography, a town of Sweden, in the province of Nerica; seven miles N. E. of Oboeo.

GLANVILLE, John, in Biography, was born at PlymOUTH in the year 1636, 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 1655, and removing to Lincoln college, he graduated master of arts in 1658, and was, about the same time, appointed chaplain to Francis Rous, 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 teaching and religious principles. He is said to have been an eager reformer in politics, but, whether this be the real fact, has been much doubted. Upon the re-establishment of monarchy and episcopacy, he conformed to the national church, a circumstance which 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 new philosophy, in opposition to the system of Aristotle, 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 persons who afterwards formed the Royal Society. About this time Mr. Glanvil 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 Frome-Selwood, in Somersetshire. He published in the same year, but anonymously, a discourse on the fundamental doctrine of the ancient eastern philosophers, which he endeavoured to prove was not incompatible with revealed religion. It was entitled "Lex 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 "Seepis 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 1666 he published his work, entitled "Some Philosophical Considerations 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 Glanvil 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 "Iis Ultra; or the Progress and Advancement of Knowledge since the Days of Aristotle." In an account of some of the most remarkable late improvements of practical 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 shew the corroboration between religion and the new philosophy, in a discourse concerning the religious temper and tendency of the experimental philosophy which is professed by the Royal Society. "While," says one of his biographers, "he was enlisting himself to the particular acknowledgments of the members of that body, by defending the reformation and useful tendency of their pursuits, he also contributed to their collection of instructive and entertaining papers, some observations on the mines in the Mendip hills, and on the natural history and springs of Bath, which were well received, and inserted in the Philosophical Transactions." In the year 1672, Mr. Glanvil exchanged his rectory of Frome for that of Streteh, in the same county, with the chapel of Walton annexed; and about the same time was made one of the king's chaplains. In 1675, he published his "Essays on several important Subjects in Philosophy and Religion," containing the principal of his former pieces, revised and improved, with a treatise, entitled "Antifanatic Theology, or the Free Philosophy." Two years after this, his "Essay concerning Preaching" came out; it was written for the purpose of dissuading the younger clergy from that affectation 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 lost heeded Dangers of Popery." Mr. Glanvil died of a fever at the early age of forty-four, and Dr. Hornecke published a quarto volume of Discourses, &c. after his death, to which is prefixed an account of the author. As a preacher, Mr. Glanvil 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.

GLAZEANA, in Ornithology, the name of a bird described by Gmelin from the figure, and suspected to be no way different from the pipiota, a kind of buck, the Alauda campbelli; which see.

GLAREOLA, a species of Tringa; which see.

GLAREOLA, in Ornithology, a genus of the Grallinæ order, founded on the natural family called by Dr. Linnaeus "Perdix de Mer," and also Glareola. The name character of this genus consists in the bill being strong, short, straight, and turned down or hooked at the tip; nodifer 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 fuscated, and containing two feathers. The number of species, according to Gmelin, are three, namely, Glareolæ, Seneagalensis, and Nebra, the first of which, however, comprises several remote varieties. Linnaeus described this as a species of hirundo, the second kind is a tringa of the same author, and the third, gallinula of Ray.

Species.


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 sparingly diffused, and is very rarely seen to remote from the southward as Britain. It shuns most in the plains of the defects towards the Caspian sea, in the neighborhood of the rivers, its food consisting of aquatic insects and worms.

One of the varieties of this species is called by Brehm Glareola toxopta, 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 face 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 the 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 Sonnert is another variety of this species; the lower part 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 on fish, and bread soaked in water.

Two other varieties occur in the East Indies, on the coast of Coromandel, and are likewise described by Sonnert; the feet of this 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.

**Gmelin.** Entirelyfuscous. Gmel. Glareola Senga-

**Tringa rufa, Br.** "Perdix de mer brune, Buff. Senga-

**ponticula."** Scearsely exceeds the former in size, being nine inches and a half in length, and inhabits Sengal. The same variety is found also in Siberia.

**N. varius.** Brown, spotted with white; lower part of the belly and vent reddish-white, with black spots; bill and legs black. Gmel. "La perdix de mer tarda," Bril. "Gal-

**limba melanopsis, Rothm. Ray. Gmelins, Buff. Spotted prati-

tch." Size of Glareola audiaca. This variety is met with in Germany.

**GLARINUS, HENRICUS, LoIRITUS, in Geography,** famined Glarianus, from the town of Glar, in Switzerland, where he was born, in 1458. 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 diffused by the learned, than his knowledge of music, by musicians.

He studied at Colom, Bafl, and Paris; his preceptor in music was John Coelhus; and in literature, Erasimus, with whom he lived in strict friendship, and by whom he was warmly recommended, in a letter till 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, entitled **APOLLOPONOS**; which includes twelve modes; to which number he wished to augment the ecclesiastical tunes, which had never before exceeded eight, from the time of St. Gregory. Zarlini, and a few more, adopted the opinion of Glarianus, but soon reestablished 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 octaves, in these two keys; and though his augmentation extends the currents of sounds used in the modes, it offers no new arrangement of intervals, as may be seen by his third stage, when it tells us that the authentic modes are D, E, F, G, A, C, and the plagal, 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 assigning two to each fractio of the octave, he would have done real service to the music of his times; but his contemporaries were not yet ready for such an innovation. Being told he had fallen in the trapnels of the church, to dare to any other fancies than those that time had consecrated, and authority admitted within its pale.

His book, however, contains many curious anecdotes and compositions of the greatest munificence of his time, which were excellent studies for his contemporaries and posterity, and, if feared, would be still very instructive and useful to young contrapuntists. Glarianus died 1563, aged 75.

**GLARIS, or GLARUS, in Geography, a canton in Switzerland, formerly subject to the abbots of the convent of Leckbingen, in Swabia, but possessing a democratical 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 from afterwards his son Albert purchased the majority, which had become royal, 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 1525, Switzerland, reunited by Zlere, 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 Helvetian confederacy, with some restrictions, which were not abolished till 1837.

It was then the 6th canton, but afterwards became lost in rank of the eight ancient cantons, as they were called. The people of Glarus enjoyed their liberties unimpaired till 1538, when the Austrians made an inroad into the canton, and pillaged the country and massacred the inhabitants. At this time 350 troops of Glarus, aided by 500 Bernese, repulsed the whole army of the Austrian prince, and compelled them to retire. In the 16th century the reformation was introduced into this canton; but the Protant and Catholic had been accustomed to live together on terms of mutual toleration. The government of this canton, similar to that of 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, laid contributions, entered into alliances, declared war, and made peace. The "Landhausman" was the chief of the republic, and was elected alternately from the two seats, with the president, that the Protestant remained three years in office and the Catholic two. The other great officers of state, and the bailiffs, were taken also by lot from a certain number of candidates proposed by the people. The executive powers were vested in the council of regency, composed of 48 Protestants and 15 Catholics; and each had its particular court of justice. The canton comprehends 350 square miles; and its population is estimated
the handsome only this and subject it inferiour its 26'.

Lat. from Glaris, According mere the was great mountains, place tb? 11

Glarus, Wallenstadt, the Glar. bedroom, Uznac, and Rappenfchweil, 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 Schwettz. At this entrance, the canton reaches from the banks of the Linth to the farthest extremity of its Alps, about 30 miles; forming a valley, which becomes narrower as you advance, and is feared more than a humidfil foot in breadth at the burch of Glarus. It afterwards opens by degrees, and, about a league from this burch, is divided by the Freiburg mountains; at the point of this division, the two rivers, Linth and Sernfta unit. The hillock of the Peak in Derbyshire, says Mr. Coke, are mere mole-hills to the Alps of Glarus. These tremendous chains of rocks are absolutely perpendicular, approach one another so near, and are so high, that the sun may be laid to rest, 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 10,000 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 muffins. Among the exports, a considerable article is flax, with which the canton abounds; the principal quarry being in the region of Sernfta, 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 superceded by the great slate quarries in Caernarvonshire. A great part of this canton consists of mountains, rocks, inaccessible forebats, and barren heaths, covered with snow; and it is subject to frequent inundations, and to the devastations occassioned by tempets and falling rocks.

GLARNISH, a mountain of Switzerland; 7 miles W.S.W. of Glarus.

GLARUS, or GLARS, the capital of the above-described canton, situated upon the Linth. The town is large and populous; and the town-house is a hardstone structure; 32 miles E. of Luzerne. N. lat. 26° 50'. E. long. 9° 3'.

GLASENDORF, a town of Bohemia, in the circle of Konigigratz; 6 miles N.W. of Trautenau.—Alice, a town of Silefia, in the province of Neisse; 11 miles S.W. of Pafchekan.

GLASGOW, a very populous, handsome, and regularly built city, in 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 archiepiscopal see, and was of course principally under the influence of the archbishop and his inferior clergy. Their power seems in those 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 lines, and other emoluments are expressly appropriated to ecclesiastical purposes. 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) teneus, must have been very great; for these barthens extended over almost the whole of the counties of Lanark, Renfrew, Dumfartone, Ayr, Dumfries, and Galloway, comprizing the whole south-west district of Scotland, and perhaps a moiety of the most fertile land in the whole kingdom. 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, some part for 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 interferences and civil wars, which devasted Scotland subseqently to the reformation, and previous to the revolution, having divested Glasgow of all that attraction which it had acquired as the archiepiscopal and occasionally as the royal residence, it appears to have been only remarkable as the occasional scene of those fantastic and furious contentions 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 Langside, 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 Bothwel 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, poifessing neither a sufficient degree of wealth or refinement to render it conspicuous for elegance or luxury, nor such security or strength as to make it defirable 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 ratified 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 rise of Glasgow in commercial importance, even under the successive checks of the two civil wars in 1715 and 1745, of the valley of greater commercial embarrassments and the consequent fall of the manufactories of Glasgow, and of its colonial trade during the American contilels, and all the subacient hostilities 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 1754, including its numerous suburbs, was returned at 94,000, and from the concealment which was practised from the idle fears of ignorant people, many of whom foolishly imagined that caius to be the precursor of a military confection, 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. M'Ure, one of the city clerks, was much esteemed, but is now considered as obsolete. Others have subsequently been written by Mr. Gibbon 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 lower part of the city is nearly level, and the rest is upon the southern declivity of a hill. Perhaps no city or 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 cobia 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 style 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 occupant, 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 exploded. 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 harony 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 spire 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 profess in general little claim to architectural embellishment or description. They are fix 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 similar 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.

Priests.—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 clerks; the middle portion 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 contemplation to erect a new prison, with an enclosed space round it, where 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 house of correction, 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 Mrs. 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 180l. or 200l.; 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 assistance is afforded gratuitously.

Theatre Royal.—This splendid 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 still 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 specific 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 very large garden laid out in grass 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 referred as a place of retirement for the professors, or of amusement for their families and friends.

The university of Glasgow was founded in the year 1451, by William Turnbull, bishop of the diocese, and now consisted of a chancellor, a dean of faculty, a principal, who was also professor of theology, and three professors of philosophy.

The professorships and lectures are now as follow:

A lord chancellor: an office now honorary, and held for life.

Lord rector: also honorary—electively annually.

Dean of faculties: chosen by the professors or regents.

Principal: by the crown—present incumbent, Rev. Dr. Taylor.

Fou. Senor.

Divinity, — appointed by the university.

Church history, — crowned.

Oriental languages, — university.

Natural philosophy, or physics, — do.

Mathematics, — do.

Moral philosophy, or ethics, — do.

Logic, — do.

Greek, — do.

Humanity, or Latin, — do.

Civil law, — crowned.

Medicine, — do.

Anatomy and botany, — do.

Practical astronomy, — do.

Lectures.

Materia medica, — university.

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 emoluments derived from the students, salaries and commodious houses 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 fringe; the students of the senior classes have no particular distinction of dress. 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 judicial capacity, assume the title of regents. Their supreme court is a general assembly of the whole faculty, who, at a remote period, afforded 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 offenses 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 class 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.

Glesga—comprehending the natives of Clyde-side, and the adjacent districts of Scotland south of the Forth.

Transportani—the natives of Scotland, on the north of the Forth.

Rothfiani—the natives of the west highlands of Scotland and of Ireland.

Lochdoniani—those 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 cases 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 paid to have offered 25,000£ 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 tellator'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 "Martyrology of St. Catherina."

Among the celebrated literary characters, which have belonged to this seminary, 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 Messrs. 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.

Merchants' Hall—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.

Public Markets—These are very commodious, and consist of square-paved courts, surrounded by the walls where the meat is exposed to sale. No cattle are slaughtered here, and they are kept very clean and regularly inspected.

Barracks—These 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-commissoned officers and privates. Their complement is 1072 men, but they will lodge, on emergency, 4 or 500 more.
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, in particular, the largest and finest in Europe. It is supported by annual subscription, the subscribers amounting to upwards of 2000, who pay one pound per share each.

Brigade—Three of these are at home, and a fourth was actually built in the year 1795, when the river rising rapidly, in consequence of excessive rains, it was swept away in one night when nearly finished. The arches being very thin, 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 higher up on the river are plain, but very well built and paved. The lowest, or new bridge, is very finely executed, and is deemed one of the most complete specimens of this species of architecture in Britain.

Waters-works.—The city of Glasgow, until lately, was supplied with water by pit-wells, and the water, though abundant in quantity, was of inferior quality both for washing and culinary purposes, as beside 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 £50,000, 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 5s. each. The rapidity with which these 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 water driven from the Clyde by two large steam engines, into a reservoir about two miles to the outfall of the town. From this reservoir it is filtered into another, and 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 eastern 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 45 miles to the southeast of Glasgow, in the same mountain which forms the sources of the Tweed and the Ayr. Near the county town of Lanark, about 24 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 or 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. Goldburn, an eminent engineer, was employed by the city of Glasgow to deepen the river, from the Broomhall or harbour, to the sea-port towns of Port Glasgow and Greenock, the former fretted 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, have 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 contraction, without the expense of carriage. Besides this, a number of labourers are employed every summer to throw the bottom between the projecting jetties. By the constant repetition of this plan, a great part of the river is now contracted to less than one-half of its original breadth, and has gained above four feet of additional depth. As the townage dues, the greater part of which is paid for this purpose, now exceed the 10,000 per annum, there is every reason to hope that this will probably be continued on a more extended scale than ever, and it is probable that in a few years vessels of large burden may be brought up to the city. The largest bitts which brought are about 150 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 the depth may be increased to 14 feet by the present plan.

It was lately proposed to improve the harbour by the construction of wet docks; but a difference of opinion having arisen respecting the measures under which these improvements were to be placed, the scheme has been suspended, but it is hoped not finally relinquished. The townage dues are one shilling per ton on merchandise, eightpence on foreign produce, and fourpence on coal, brick, and other building materials. Muir, 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 sand is often brought at a very cheap rate 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 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 refuges of the operative tradesmen, are the following:

CAIRN—a very populous village, immediately adjoining to the city on the north-east, and bordering on the Green of Glasgow. This village contains upwards of 20,000 inhabitants, with many manufactories, dairies, &c. The green serves both for pasturage and for the purposes of walking and bleaching. There are a considerable walking-place, and fine walks for the recreation of the inhabitants. The dues of walking and pasturage form part of the city revenue. The green contains upwards of 100 acres of ground.

Bridgegate—
Glasgow.—Another suburb adjoining to the former, and similar in every respect.

Gorbals.—A village on the opposite bank of the Clyde, governed by a chief magistrate, appointed by the council of Glasgow, and two resident bailies.

Anderton, Broomiel, Finnieston, and Partick.—These four villages lie to the north of Glasgow, on the north bank of the Clyde; they are also residences for operative tradesmen, and contain several extensive manufactories, viz. three large cotton mills, an extensive putting-field, and porter brewery, at Anderson; a large and flourishing glass-work at Finnieston, and the very large flour-mills belonging to the incorporation of bakers at Glasgow, at Partick, where are also the remains 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 burgesses, who exercise 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 convenor, or president of the trades, the city treasurer, and master of the public works, twelve counsellors from the merchants, and eleven from the incorporated traders, 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 Dumfriesshire, 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 advisers. The jurisdiction of this court extends to any amount subject to an appeal to the court of seisin.

3. The confidence 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 sitting magistrate also decides daily trifling claims under five shillings. The magistrates also exercise 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 subtitute. His jurisdiction is equal to that of the magistrates, not only within the city, but the district. The decisions of this court are subject by 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 sessions, and from the quarter sessions to the court of seisin.

7. The small debt court is held by two or more justices, for the decision of causes under 10s. No professional lawyer is heard here, and the pleadings are verbal. They review their own decisions upon appeal, provided the sum demanded be lodged with the clerk of court.

8. The commissary court is the remnant of the bishop's court. It decides for sums under 3l. 6s. 8d., and also in cases of detention. 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 5l. or upwards of yearly rent; and of a voter, that of any house at 10l. 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 intendant 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 1s. 5d. 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 formerly opposed its original adoption.

Commerce and Manufactures.—The commercial importance of Glasgow only began to rise subeutaneously 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 90,000 bales. of tobacco imported into Britain in 1772, 49,000 bales. were brought into the Clyde alone, and, in 1775, the importation was 52,143 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 suspended 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:

<table>
<thead>
<tr>
<th>Description</th>
<th>Vessels</th>
<th>Tonnage</th>
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<tr>
<td>At Greenock inwards</td>
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</tr>
<tr>
<td>Foreign trade</td>
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<td>53,546</td>
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<td>Coast and fishing</td>
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<td>35,532</td>
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<td>At port Glasgow inwards</td>
<td>113</td>
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</tr>
<tr>
<td>Foreign trade</td>
<td>113</td>
<td>18,722</td>
</tr>
<tr>
<td>Coast and fishing</td>
<td>182</td>
<td>7,226</td>
</tr>
<tr>
<td>Outwards</td>
<td></td>
<td>551</td>
</tr>
<tr>
<td>Foreign trade</td>
<td>177</td>
<td>25,137</td>
</tr>
<tr>
<td>Coast and fishing</td>
<td>119</td>
<td>7,202</td>
</tr>
<tr>
<td>Total</td>
<td>599</td>
<td>238,792</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17,077</td>
</tr>
</tbody>
</table>
GLASGOW.

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 or trades to the Clyde. The articles of exportation are chiefly British manufactured goods, coals, fish, &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 interlacks 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. 135,000. It also estimates the total value of the goods made yearly at 1,000,000l. The grounds of this calculation are not flated, and little reliance can be placed on it, for the value of cotton goods has fluctuated as remarkably as the quantity has extended.

Two manufacturies of earthen ware 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 calicoes 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.

Of the chemical works carried on in Glasgow, some are peculiar to it. The manufacture of Cudbear was introduced by Messrs. Mackintosh so long ago as the year 1777. It is prepared from rock-mofs, and above 2000 gallons of human urine are daily consumed in the process. The cudbear gives a dark reddish colour, and is used in the dyeing of leather, woollen fluffs, &c. The processes is kept profoundly secret.

Discharging of the Turkey red dye is also peculiar to Glasgow. This process is particularly described under the article Discharging of Colour.

The manufacture of the oxy-murate 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 was the refuge of a great archbishop 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 far ended, 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 title 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 desirable 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 salutary to which commercial enterprise is peculiarly exposed, may often prove of real benefit and utility to the possessor.

The city of Glasgow returns a member to the British parliament, conjointly with the neighbouring burghs of Rutherglen, Renfrew, and Dumbarton.

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 linking into the more sea-port of Glasgow, however much their wealth, revenue, population, and general prosperity might be benefitted 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 cullion-house, where the general customs of the Clyde are collected. There is here also a fine graving-dock built by the merchants of Glasgow long before that of Greenock was executed, and this circumstance alone brought many ships up to that 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
GLASS 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 continue to find a considerable portion of their capital, and may from the many calamities and fluctuations to which commerce in this eventful age is exposed, prove rather burdens than advantages, while the mere shipowner, if deprived of a freight or charter-party at one port, may with greater facility seek it at another, than the person 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 spanning. Both of these are carried on to a very considerable extent. A work was erected four 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 Ardrossan, near Irvine, which is about thirty miles farther down the river than the present canals. 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 state of Renfrewshire, and the northern district of Ayrshire, by affording means for the cheap conveyance of coal, lime, manure, and other heavy articles by means of the canal. Ardrossan 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 feasons and in all weathers. A considerable sum has already been subscribed 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 whole local interests will suffer by the facilities of this undertaking, and these comprehend many wealthy and powerful classes; but whilst some oppose, others will find its 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 finished harbour at Ardrossan, capable of receiving ships of large burthen, and this also is begun. The subscriptions for the two undertakings are conducted separately. The coal 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' sail, when this may prove to be the case. The surveys, plans, and estimations for the canal and basin of Ardrossan 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 Newber district, North Carolina, taken from Dubbs's county; bounded N. by Edgrom, S. by Leon, 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 acceptation of this term among Ch. myr., denotes any substance or mixture, earthly, saline, or metallic, which is reduced by igneous fusion to the state of a hard, brittle, uniform mass, which breaks with a conchoidal fracture, falling into splinters, and with a high degree of luster. Most glasses of this kind are also transparent.

See VITRIFICATION.

GLASS, Pήρημ, a more restricted term, and as the term is commonly used in the arts and manufactures, signifies that transparent, solid, brittle, fictitious substance, produced by the vitrification of silicious earths with various lots 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 glās, Tacitus (Ger. c. 45) and Pliny (l. xxxvii. c. 5) inform us, that amber was called among the ancient Gauls or Germans by the name of glabum or glāibus and from the similarity which glās bore to amber with respect to transparency and brightness, it acquired a name, which was, in all probability, originally the same. The word glās denoted, without doubt, a thinnest or transparent substance, as glāsum expreses at present in the German language to thin; and our English word to glase is derived from it, and has nearly the same signification. Ducange says that some critics were of opinion, that the word glaself itself implied glasses rather than amber. The ancient Greeks, as it has been observed, applied the same term (σαρκίων) both to glass and amber. The herb with which the Britons painted their bodies had also the name of glāsium, perhaps from the flashing appearance it might give to their skins, or possibly because its ashes might be used in the making of glases. The Latins called the famous paint by the name of vitrum, the word they used to signify glases. (Cicero, Bell. Gall. I. v.)

We find frequent mention of this plant in ancient writers, particularly Cæsar, Virgilus, Pliny, &c. who relate, that the ancient Britons painted or dyed their bodies with glutam, guanam, vitrum, &c. i.e. with the blue colour procured from this plant. And hence, as from having been used, the fictitious manner we are speaking of, came to be called glases, as having always somewhat of this kind in it.

Mercurie (Not, in Aut. Nicii de Art. Vitrum.) gives us the several characters or properties of glases, by which it is distinguished from all other bodies, viz. 1. That it is an artifical cocerote of salt and sand, or bones. 2. Fusible by a strong fire. 3. When fused, transparent and coherent. 4. It does not melt or confine in the fire. 5. When melted, it changes to iron. 6. Dustible, when red-hot, and fusible in any way, but not malleable; and capable of being blown into a hollowness, which no mineral is. (See Ductility of Glases.)

7. Frangible when thin, without annealing. 8. Fusible when cold. 9. Always inflammable, whether hot or cold. 10. Flexible and cartilaginous. 11. Diffusible by cold and moisture. 12. Only capable of being drawn, or cut with a
GLASS.

diamond or other hard stones, and emery. 13. Receives any colour or dye, both externally and internally. 14. Not dissolvable by aquafortis, aqua-regia, or mercury. 15. Neither aed juices, nor any other matter, extract either colour, taste, or any other quality, from it. 16. It admits of polishing. 17. Neither loses of weight nor substance, by the longest and most frequent use. 18. Gives fission 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 colored. 21. An open glass, filled with water in the fummer-time, will gather drops of water on the outside; just as 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 broken, fly asunder, with a loud noise. 23. Neither wine, beer, nor any other liquor, will make it muddy, nor change its colour, nor ruff 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 Arnonica. For the electrical properties of glasses, see Electric, &c.

Glass, origin and history of. De Neri will have glasses as ancient as Job; for that writer, chap xxviii. ver. 17. speaking of wisdom, says, "gold and glasses cannot equal it." This, we are to observe, is the reading of the Septuagint, Vulgate Latin, St. Jerom, Pineda, &c. for in the English version, instead of glasses, we read crystal; and the same is done in the Chaldee, Arias Montanus, and the king of Spain's edition. In other versions, &c. it is read stone; in others beryl: in the Italian, Spanish, French, High and Low Dutch, &c. diamond: in others, carbuncle: and in the Terzaghi, looking-glass.

In effect, the original word is χυαβιθ, (717; 71) which is derived from the root χυατιναι, to purify, cleanse, stone, white, transparent; and the same word (Exod. xxx. 34.) is applied to frankincense; and rendered in the Septuagint πάρις. 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. iii.) is, according to Dr. Falconer (Manchester Memoirs, vol. ii.) the most ancient writer (B.C. 440) who used the word παρίς, which is generally understood to signify glasses. But he evidently does not mean artificial glasses, nor glass paint, but most probably, some of the talecy kind, or lapis specularis, which might readily be framed in such a manner, as to form a convenient transparent cafe, such as the ancient historian has described. Aristophanes (B.C. 420) seems to be the next writer who mentions glasses: that poet, in his comedy called the Clouds, scene I. act. 2, uses the word λυαλθ, (352,) which is now ordinarily rendered glasses. He there introduces Strepsiades teaching Socrates a new way to pay old debts, viz: "by placing a fair transparent stone, fold by the druggists, from which the fire is struck, between the fun and the writing, and so melting away the letters thereto." This stone Socrates calls λυαλθ, which the Scholiast on Aristophanes derives from ειναι, to rain, from the likenesses it bears to ice, which is rain, or water congealed; though, it must be owned, the word λυαλθ is ambiguous, and signifies crystal as well as glass: and Gorrinus observes, that the ancients had a kind of yellow amber, transparent as glasses, called by some λυαλθ.

Aristotle (B.C. 350) has two problems upon glasses: the first, Why we see through it? The second, Why it is not malleable? If these problems be Aristotle's, which the learned Vol. XVI.
again melted, and tinged of the colour required. Some of these pieces are brought to the shape 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 manufactories, as specular or looking-glasses were first invented there; "liquidum etiam specula excogitaverat." Such is the ancient method of making glafs, decribed by Pliny. In his time, it was made with sand found at the mouth of the river Vulturnus, upon the shore, for six miles between Cumae and the Lucrane 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 fojil alkali, either by weight or measure; and being fused, was conveyed in a liquid state to other furnaces, where it was formed into a mass, called "ammonium," (or sand combined with the fojil alkali,) which mass was melted, and became then pure glafs, and a mass of white vitriof matter. The same method of making it prevailed in Spain and Gaul. Glafs was likewise made to imitate the lapis Obsidians, a substance found by a person of the name of Obsidius, in Egypt and Ethiopia. This substance was of a black color, but yet obtainable, 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 saw solid statues 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 "hematium," one of various colours, called "myrhum," a white, a clear red, a blue, and indeed molt other colours. Pliny observs, that no substance was more manageable in receiving colours, or being formed into shapes, 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, 6000 s. lidders, or nearly 50,000 l. lidders. The inferior kinds were not uncommon, as Pliny informs us, that the use of glafs cups had nearly superceded 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 cautery for ulcers (l. xxxvii. c. 3.). He was likewise acquainted with the comparative hardines of gems and glafs, as he observes, that the lapis Obsidians would not scratch the true gems; and he also mentions (l. 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 Gem.) Josephus, d. ii. c. 10.) mentions the fund of the river Belus, in Galilce, as fit 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 mallenable, or rather flexible; though Petronius Arber, and some others, assure us, that the emperor ordered the artist to be beheaded for his invention. In the time of Martial, (A.D. 84) 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. i. ii. 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 Aphrodisius (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 street assigned 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 long after.

Mr. Nixon, in his observations on a plate of glafs found at Herculanum, which was destroyed A.D. 79, on which occasion Pliny lost his life, offers several probable conjectures as to the ufe to which such plates might be applied. Such plates, he supposes, might serve for specula, or looking-glases; for Pliny, in speaking of Sidon, adds, "liquidum etiam specula excogitaverat;" the reflection of images from these ancient specula being effected by reflecting them behind, or tinging them through with some dark colour. (See Mirror.) Another ufe 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 mira coxae (lib. xxxvii. cap. 25. § 64.). Mr. Nixon farther conjectures, that these glafs plates might be used for windows, as well as the lanae of lapis specularis and phengites, which were improvements in luxury mentioned by Seneca, and introduced in his time. Ep. xc. However, there is no positive authority relating to the ufeage of glafs windows earlier than the close of the third century: "Maneullis et," says Lactantius, "mentem effe, per ocules ea quae sunt opposita, transmittit, quam per fenstrulas lucente vitrum spectari lapidem obseotum." De Oplifici Dei, cap. 5. See Phil. Trans. vol. l. art. 80. p. 601, vol. iii. art. 23. p. 123.

St. Jerome (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 (about A.D. 554), speaks of the brightness of the sun's rays, passing through the eastern windows of the church of St. Sophia, at Constaninople, which windows were covered with glafs. Gregory of Tours (A.D. 571) laments the devastations frequently committed on 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 plaster, much in the same way as at present.

If the opinion of Pennant, suggested under the article ANGUINUM, 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 flats but.
and houses to have consisted of a thick, sometimes white, but mostly blue-green, metal.

According to venerable Bede, artificers skilled in making glass were brought over into England, in the year 674, by abbot Benedict, who were employed in glassing the church and monastery of Weremouth. 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 glass, or at least of applying it to this purpose, was unknown in Britain: though glass windows did not begin to be used before the year 1180: 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 then first, next France, from whence they came into England.

Leo Olifens (A.D. 760) speaks of the windows in his time being made with glass-plates fixed in lead, and fastened together with iron. Ananiaus, an historian of Rome, who was librarian to the pope, mentions, that in the pontificate of Leo III. who became pope about the year 800, painted glass in windows was in use. The statues of the church of Trugier, in Lower Britain, about the year 1156, speak of the windows of churches and chapels being ornamented with arms and military emblems painted upon the glasses in them. A charter of Richard II. of England, quoted by Rymer, (A.D. 1386), contains a paragraph in which is mentioned glass, together with the manufacture of it for windows.

Venice, for many years, excelled all Europe in the fineness of its glasses; and in the thirteenth century, the Venetians were the only people who had the secret of making crystall looking-glasses, and which they performed by blowing, much in the same manner as a considerable quantity of the common mirror-glass is now manufactured. The great glass-works were at Muran, or Murano, a village near the city, which furnished all Europe with the finest and largest glasses.

The glass manufacture was first begun in England in 1557: the finer sort was made in the place called Crotchted Friars, in London; the fine flint glasses, 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 1655, when it was carried on with sea-coal or pit-coal, instead of wood, and a monopoly was granted to Sir Robert Manfield, who was allowed to import the fine Venetian flint glasses for drinking, the art of making which was not brought to perfection before the reign of William III. But the first glass plates, for looking-glasses 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 glasses into England, by means of Venetian artificers, with amazing success. So that within a century past, the French and English have not only come up, but even surpassed, the Venetians, and we are now no longer supplied from abroad.

The French made a considerable improvement in the art of glasses, 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 industry to cultivate and improve the glass manufacture. A company of glass-men was established by letters patent; and it was provided by an act, not only that the working in glasses 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 Cherbourg, in Normandy, on the plantation of the Venetian manufacture; but the beautiful art of making flint glasses was invented in France about the year 1688, by a person of the name of Abraham Theyart; and a company was soon established for this branch of manufacture. This window glass first carried on at Paris, and soon after removed to St. Gobin, where it still excels in full activity, and undiminished reputation. An extensive manufacture of this kind was first established among us near Prefcat in Lancashire, about the year 1723, 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 relieved and encouraged by government, they have succeeded in producing plates rivaling, if not surpassing in fire, 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 fulness and some sort of silicious earth.

1. The first ingredient we shall specify is flex or flue. The best is that which will melt, and which is white and transparent. It is this that gives confidence and firmness to the glass. This is found principally in Italy, being a sort of dirty fulness called tarso: the next is peaces, or conglodes, a sort of pebbles found at the bottom of rivers, and gathered for the Venetian manufacture out of the river Po, which are faid not to be inferior in whiteness to albaster.

Indeed, nothing makes finer and clearer glasses than common flint, distinguished for this use by its clear transparency, black colour; this, before it is used, must be heated red hot, and then immediately quenched in cold water. The heat whitens it, and the water cools it to split in every direction, and facilitates the grinding of it. The charge of preparing this deters the glasses-men from using it. The rounded fragments of quartz, found in the banks of rivers among mountains, are sometimes used in foreign countries, being first heated and ground to powder. Indeed, the preparation necessary for flint, in general, is to calcine, powder, and mix it.

Ant. Neri observes, that all white transparent flours, which will not burn to lime, are fit to make glasses; and that all flours which will strike fire with steel, are capable of being employed in making of glasses. But this latter rule, Dr. Meret observes, does not hold universally. Where proper flue cannot be had, sand is used; and it is now almost the only kind of fulness employed in the British manufactures of glasses. The best for this purpose is that which is white, small, and fining; examined by the microscope, it appears to be small fragments of rock crystal. For green glasses, that which is of a soft texture, and more gritty; it is to be well washed, which is all the preparation it needs. Our glass-houses are furnished with white sand for their crystal glasses from Lynn in Norfolk, and Maidstone in Kent, and from the western extremity of the Isle of Wight; and with the coarser, for green-glasses, from Woolwich.

2. The second ingredient in the manufacture of glasses is an alkali, which is either soda, or potash. It is always used at first in the flake of carbonate, though the carbonate acid flies off in the process. For the method of preparing each, see CARBONATE. These alkalis are used in different degrees of purity according to the required quality of the glasses. The finest sort of glasses requires the boil purities, purified by solution and evaporation, to dry; but for inferior glasses cheaper alkalis, such as barbital,
GLASS.

wood-ashes, and kelp, are employed. The ashes of fern will also yield a salt, which will make excellent glass; and, moreover, the ashes of the cobs and flakes of beans, as also those of coleworts, bramble bulbs, millet-flakes, rushes, cyr-eyes, 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 glass, and for various purposes. Lime, in the form of chalk, is employed in the manufacture of glass; but this must be used only in small proportions; for an excess would act powerfully on the sides of the glass-pot, in consequence of the escape of the carbonic acid from the chalk during the fusion; and besides, it would render the glass opaque and milky in cooling, however clear it might be when hot. It is known by experience, that to 100 parts of flux 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 cleanness of the glass. Borax is another very valuable flux; but its high price restricts the use of it to the finest kinds of glass, 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 glass.

Of the oxides of lead, litharge and minimum are found to be of singular use in the manufacture of glass. Litharge is a powerful flux, and imparts to the glass 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 becoming liable to crack, and also greater tenacity when red-hot, so that it is more easily wrought. A considerable quantity of this oxide is contained in the finer glasses; such as the London finit glasses, and which is used for the table, for hilites, for artificial gems, and for most optical purposes. Glass, 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 flux and alkali, that a piece of glass shall be throughout of uniform density. Another ingredient occasionally used in glass is the black oxide of manganese, called "glaes-fosp," from its use in clearing the glass from any accidental foun- nes of colour, and more especially from the green tinge, owing to the presence of iron. Scheele and Bergman in their respective "Essays," have illustrated many curious circumstances that attend the use of manganese in glasses, which are particularly detailed in Aikin's Dictionary. The manganse should be chosen of a deep colour, and free from specks, of a metallic appearance, or a lighter cast: 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 glasses is accounted for by M. Montany, in his "Traité des Couleurs pour la Peinture en Email," in the following manner; the manganese destroys the green, olive, and blue colours of glass, by adding to them a purple tinge, and by the mixture producing a blackish brown colour: and as blackness is caused merely by an absorption of the rays of light, the blackish tinge given to the glass by the mixture of colours, prevents the reflection of so many rays, and thus renders the glass less coloured than before. But the black produced by this substance suggests an obvious reason for using it very sparingly in those compositions of glasses, which are required to be very transparent.

This purple colour may be corrected by charcoal, or in the glaze-house, by thrusting a billet of wood down into the melted glass, which becomes charred by the intense heat, and causes the purple hue to vanish, with a slight effervescence of the glass, and escape of numerous small air-bubbles. Or, the other hand, if a small quantity of nitre is added to glasses containing manganse, the purple colour is restored, or, if present, the discolouring effect of the charcoal is prevented, till the nitre becomes alkaliized by the heat, and mixes with the other ingredients of the crucible. For the explanation of these phenomena, it is observed, that the oxide of manganse gives the purple colour only so long as it remains in its higher state of oxidation; but when in contact with charcoal, the latter partially decomposes it, and the carbonic acid gas formed, the cause 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 restores its colouring power. The other substances which take away the colour from glasses, tinged red with manganese, are all the salts with the basis of fulphuric acid, such as gypsum, fulphat 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 tingling power of manganese is perfectly destroyed by the addition of arsene in any form. Thus, a mixture of oxide of cobalt and oxide of manganese, in the colouring flate, is of a dark purple; but on the addition of any arsene, or of white arsene, 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 arseneal; and nitre is also generally added to keep the manganese always at the proper flate for imparting its colour. The oxide of man- ganeser is a very powerful flux for all earthly matters; and this, as well as lead, gives a great density to glasses. The white oxide of arsene is another powerful and cheap flux in the making of glass; but it should be very moderately used; for it takes a longer time to mix intimately with glass, and to allow it to be perfectly clear, than any other of the additions commonly employed. For want of this the glass has a milky hue, which increases with age; and when the arsene is in excess, the glases becomes gradually soft, and is decomposed. Besides, glasses 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 glass, and is designed to answer particular purposes, some of which we have already specified. It not only serves to destroy the strong tinge of yellow which is found in glases, prepared with lead as a flux; but in eaine glases, 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 tele- scopes, &c. see ABBERRATION.

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 glases, so much the more fusible, soft, coloured, and dense this glass is, and reciprocally.

The colours given to glases by calcis of lead are shades of yellow: on the other hand, glases that contain onlyeline fluxes partake of the properties of fales; they are less heavy, less dense, harder, whiter, more brilliant, and more brittle than the former; and glases, containing both ealine and metallic fluxes, partake of the properties of both these substances. Glases too, in which glass is safely fusible, capable of alteration by the action of air and water; efficaciously those in which alkalis prevail; and these are also liable to be injured
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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, phlogilic or felsic, the artist may know how to adjust the proportions of these to feldspar or powdered flints, for the various kinds of glaze.

GLASS, proportion of ingredients in. Different kinds of glass require different proportions; nor have these been precisely ascertained. We shall here, and in subsequent articles, state several of the most usual and approved mixtures that have been proposed. When felsic is melted with twice its weight, or more, of dry carbonated alkali, either potash or soda, the result is a very soft deficient 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 fels in alkali. When the felsic alkali is equal to the fels in weight, or does not much exceed it, the glaze is now transparent, but it is still soluble in water. It is not till the alkali is diminished to about one-half of the weight of the fels, that the glaze becomes perfectly hard and infusible in any corrosive liquors, (the fluoric acid excepted,) and, in short, acquires the character of a perfect glaze. This proportion, therefore, of two parts of fels to one of alkali, is usually the datum on which the doses of the alkalies 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, 100 lbs. of these would require no more than about 20 lbs. of fels. If the belt Spanish barilla, containing from 45 to 50 per cent. of carbonate of soda, be used, an equal weight of fels may be added; but if purified pearl-ash be taken, it will melt down perfectly twice its own weight of fels. But glazes composed merely of pure alkali and fels, require a very strong fire for their fusion, and are hard, hard, and difficult to break: they are therefore never used alone. As one half the weight of the fels is reckoned an abundant allowance of alkali, it follows of course that when litharge, 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 glaze be required that is dense, fusible, and not fustine, one part and a half of red lead or leady, may be mixed with one part of fels, and fused together: if equal parts of fels and of calc of lead be employed, a glaze somewhat less dense and harder will be produced: if a glaze be required of very little density, only fustine fluxes must be employed. A glaze of this kind may be composed of five parts of fels of tartar, or of potash, or of pure soda, mixed with eight parts of fels or of fints; or of four parts of any of the above-mentioned alkalies, mixed with two parts of nitre or of borax, and eight parts of vitrifiable earth. When a crystal glaze is required, which shall be of an intermediate quality between the metallic and fustine glazes, it may be made from a mixture of one part of the above mentioned fints, one part of calc of lead, and two parts of fels or other vitrifiable earth. By varying the proportion of these ingredients, many different kinds of glazes may be produced, each of which may be good, if the quantity of each of the fluxes employed be proportionate to its vitrifying power.

GLASS, instruments for manufacturing. These are sub-divided into two different purposes, viz. the levigation and mixture of the ingredients, and the fusion or vitrification of them. To the former class belong hobs or hand-mills, mortars and pestles, flat stones and millars, and shears or seizers. The other sort of utensils 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 qualities of the glaze, &c. See the following articles. See also GLASS-BOGEY, FURNACE, and GLASS-POTS.

GLASS, fritting of. When the ingredients are selected and properly proportioned, they are first calcined for a longer or shorter time, before they are put into the glaze-pots. This operation is called "fritting," and is performed either in small furnaces adjoining to the proper glaze-furnace, and heated by the same fuel after its chief force has been spent upon the glaze-pots, or else in small furnaces or ovens constructed for this purpose. The uses of fritting are, to expel all moister from the ingredients, by which the glaze-pots would be endangered; to discharge part of the carbonic acid from the alkalies and chalks, and thus to moderate the swelling in the glaze-pots, and especially to cause an adhesion, or commencement of chemical union, between the alkali and fels, and metallic oxides. 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 carbonaceous matter. When the ingredients are sufficiently fritted, they are thrown with clean iron shovels through the side-opening of the furnace into the glaze-pots, the fire having been previously raised to its greatest intensity, to prevent the furnace from being chilled and to fire 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 side-opening is closed up with wet clay, excepting a small hole for examining the work, which is pulled down when the glaze is well refined and about to be worked off. As soon as the frit begins to feel the action of the fire in the glaze-pots, which is immediately raised to its greatest pitch, it links down into a soft pally state, increasing in tenacity till the fusion is complete. However, it is still opaque, from the rising of a white porous fume, known by the name of "fandiver," or "glaze-gall." This fustance appears to be a confounded mass, consisting of all those faults contained in common alkalies, which readily melt at somewhat less than a glaze-melting heat, and are either naturally soluble in a considerable degree, or have little, if any, affinity for fels, and not uniting in the composition of glazes, but being lighter, rise to the top. Another heterogeneous fustance, called "fandiver," is sometimes found at the bottom of the pots. This is quite different from the other, and seems to consist of a vitriified mass of arienic and other impurities. But the fume, or proper"glaze-gall," is almost entirely fustine. When laked out and cooled, it forms a crumbly mass, sometimes white, at other times brown and foulish, and strongly fustine, but not uniform in its composition, being sometimes merely fust, often very bitter, probably as common falt and sulphate of potash predominates. It is so volatile in a strong fire, that it is constantly Siberating from the surface of the glaze in a dense vapour, which is first thick and black, afterwards white, and which corrodes the top of the crucible in its passage. With long continued fusion it would entirely escape in this state, if it were not fumed off with long lades, and sold to metal refiners as a powerful flux. Abundance of this glaze-gall is attended with one of the greatest inconveniences to the maker of glaze, as it requires a considerable expence of strong
strong heat to dissipate the whole of it, or otherwise the glass would be full of bubbles, unbound, and having a cloudy gelatinous appearance. It is observed, that glasses from potash is more likely to suffer from glass-gall than the soda-glasses is, because the potash glasses are harder, and do not run so thin as the other, and the glass-gall from them does not easily dissipate in the fire.

During this process samples for examination are drawn out of the pots with an iron rod; and the glasses gradually becomes more and more flexible, dense, and less brittle, and at last the glass-gall is entirely dissipated. Whilst the heat is continued, the glass which was full of specks and bubbles is refined, and becomes beautifully clear, transparent and colourless; and this process, which goes on from the evaporation 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 glasses is complete; but being too thin for working, it is cooled, by dropping the draught of fire round the pot which contains it, and in cooling it thickens to a fit flate for being wrought. For glasses that is call into plates, its 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 possesseth a singular kind of condition and tenacity. It is just soft enough to yield with ease to any external impression, even to the force of the breath urged pretty strongly in the centre of the glowing mass, and may be bent and shaped in every possible way; and such is its tenacity, that it extends uniformly without any cracks or fissures; but when stretched out to the utmost, it forms a fold, the diameter of which is constantly decreasing till it separates from the mass in a thin expiaphy thread. It thickens as it cools, and becomes perfectly brittle and also transparent. As melted glasses adheres very feebly to polished metal, it is very easily wrought with bright iron tools.

Glass, working or blowing round.—Every kind of glass, 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 the tube till the metal adheres to the iron like some glutinous or clammy juice; he then holds it near the ground, so that the mass is extended by its own weight, and blows strongly into the tube. With his breath thus penetrating into the centre of the red-hot mass, 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 thickens by cooling, and thus preventing its sinking 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 utensils. As a specimen of his art, we may imitate a common tumbler. The hollow globe already mentioned is taken off the iron rod by the following simple procés: An affilant dips the end of a short solid iron rod into the glass-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 glass 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 little 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 glass-pot, and is cut away from the spout, and so to the form of a cup by iron tongs. The operator, when employed in fashioning the globe, usually sits upon a kind of arm-chair, with its arms disposed forwards and covered with a flat smooth iron-plate; and by laying the iron rod straight before him, resting on both the arms of his seat, and twirling it backwards and forwards, the hot glasses at the end is made to revolve like clay on a potter's lathe, and thus is opened, widened, or compressed at pleasure by any simple iron instrument that is prefixed against it. The chuck 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 burr or roughness, with sharp fragments, which is seen at the bottom of all glasses-vessels, unless it be taken off by polishing. The next operation is that of cooling the vessel very gradually, called "annealing." See Annealing of Glass.

Glass, different kinds of. The manufactured glasses now in use may be divided into three general kinds; white transparent glass, 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 lights; and the glasses for plates and small vessels. And these again differ in the substances employed as fluxes in forming them, as well as in the corendelic or fineses of each 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 make the glass perfectly from all colour; but for the same reason likewise, either the white Lynn 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 glass, and the bell kind of phials, will not be so clear as they ought, if either too brown sand, or impure fatts, 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 artih by whom they are manufactured.

Glass, Crystal. Foreigners use this term for our flint glasses, and for making it they give the following directions: Take of the white talc, pounded small, and leared as fine as flour, two hundred pounds; of the salt of boron, a hundred and thirty pounds; mix them together, and put them into the furnace, called the calcar, first heating 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 crystal: Take of this crystal frit, called also bollis; set 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 fassa, which wets otherwise the crystal obscure and cloudy. This lution must be repeated again and again, as often as needful, till the crystal be fully purged; or, this fema may be taken off by means of proper ladles. Then set
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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 green, add more manganese, at discretion, by little and little at a time, taking care not to overdry it, because the manganese inclines 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 vessels 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 sand was understood; and retains the name though no flints are 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 fluxes used for the crystal glasses are felspar or arsenic, and the body consists of calcined flints, or white river pebbles, tarso, or fine stones. This glass, on account of the quantity of litharge, which enters into its composition, is the heaviest, the most brilliant, the softest and most easy to work, and also the most expensive. It is that fine glass, of which the common and most valuable articles of white glasses 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 proportionate quantity of arsenic to aid the fluxing ingredients. The most perfect kind of flint glasses 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 nitre, and five ounces of manganese.

From others we have the following composition for glasses 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 oxyd of manganese. The following composition for a fine crystal glass is given by Loyola: 100 pounds of white sand, 86 to 85 of red oxyd of lead, 25 to 30 of pearl-ashes, 3 to 4 of nitre, and one ounce of manganese. The specific gravity of this glass, and of the common London flint-glasses, is about 3.2.

Another composition of flint glasses, 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 eight ounces of manganese. To either of these a pound or two of arsenic may be added, to increase the flux of the composition. A cheaper composition of flint glasses 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, five pounds of arsenic, and four ounces of manganese; or, instead of the arsenic, 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-glasses, consists of a hundred and twenty pounds of white sand, thirty pounds of red lead, twenty-five pounds of the bell pearl-ashes, ten pounds of nitre, fifteen pounds of common salt, and five pounds of arsenic. 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-petre, half a pound of arsenic, and five ounces of manganese. And a cheaper composition is formed by a hundred and twenty pounds of calcined flints, or white sand, forty-six pounds of pearl-ashes, seven pounds of nitre, fix pounds of arsenic, 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 fine 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 glases like a diamond. This experiment, duly varied, may lead to several useful improvements in the arts of glases, enamels, and fustifications, and forms an expedient method of making glases, without any fixed alkali, which has been generally thought an essential ingredient in glases; and it is not yet known whether calcined crystal, or other sublunaries, being added to this salt instead of sand, might not make a glas approaching to the nature of a diamond. Shaw's Lectures, p. 426.

GLASS, Crown, is the best sort of window-glas, and differs from the flint-glasses in containing no lead, nor any metallic oxyd, except manganese, and sometimes oxyd of cobalt, in minute doses, not as a flux, but for correcting the natural colour. This glass is much harder and harder to the touch than the flint-glasses; but when well made it is a very beautiful article. It is compounded of sand, alkali, either potash or soda, the vegetable athes that contain the alkali, and generally a small portion of lime. A small dose of arsenic is often added to facilitate the fusion. Zaffre, or the oxyd of cobalt, with ground flint, is often used to correct the dingy yellow of the inferior sort of crown-glasses, and by adding the blue, natural to glases coloured with this oxyd, 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 corrective of bad colour is required. A very fine glasses of this kind may be made by 200 parts of pretty good soda, 300 of fine sand, 35 of lime, and from 270 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. Ratcliffe crown glasses, which is the best and clearest, and was first made at the Bear-garden, on the Bank-side, Southwark, but since at Ratcliffe: of this there are twenty-four tables to the cafe, the tables being of a circular form, about three feet six inches in diameter.

2. Lansell crown glasses, which is of a darker colour than the former, and more inclining to green. The following composition has been recommended for the best window or crown glasses, viz. white sand, fifty pounds; of purified pearl-ashes, thirty pounds; of salt-petre, fifteen pounds; of borax, one pound; and of arsenic, half a pound. If the glass should 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 arsenic, 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 arsenic, and two ounces of manganese. But a cheaper composition for this purpose, consists of a hundred and twenty pounds of the cheap 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 arsenic.

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 glases, which is afterwards cut by the glazier's
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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 glass 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, greenish colour. There are but twenty-five tables of this to the cafe.

Glass, German, is of two kinds, the subite and the green: the first is of a whitish colour, but is subject to those small curved breaks, observed in our Newcastle glass, though free from the spots and blemishes thereof. The green, besides its colour, is liable to the fame breaks 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, flaws, and other blemishes; and, besides, is frequently warped. Leyburn fays, there are forty-five tables to the cafe, each containing five superficial feet; some fay there are but thirty-five, and six feet in each table.

Glass, Phila, is a kind of glass 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 falt, five pounds of arfene, and five ounces of manganef. The compofition for green or common phila glasses, consists of a hundred and twenty pounds of the cheapest white sand, eighty pounds of wood-ashes, well burnt and sifted, twenty pounds of pearl-ashes, fifteen pounds of common falt, and one pound of arfene.

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, vase, 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 flint glasses, after the alkali and falt have been extracted by lixiviation, and in England flags from the iron furnaces. Bottle-glasses is a very hard well-vitrified glasses, which refits 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 vessels, 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 harp-lefs lump, as the lead-glasses would do. The following composition is given by Loycelf as a good and cheap material for bottle-glasses: viz. 100 parts of common fand, 50 of varece (a kind of coarse help made on the western coasts of France), 160 of the lixiviated earth of ashes, 50 of frith 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 glafs-glost. This kind of glafs is made of sand of any kind, mixed by the ashes of burnt wood, or of any other part of vegetable; to which may be added the feorize or clinfers of forges. When the fift glafs is made, 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 clinfers consists of a hundred and seventy pounds of wood-ashes, a hundred pounds of fand, and fifty pounds of clinfers, or feorize, which are to be ground and mixed together. If the clinfers cannot be ground, they must be broke into small pieces, and mixed with the other matter without any grinding.

A good bottle-glasses, but nearly black and opaque, has been made in France of the decomposed pulverulent basaltic earth found in the valleys of all basaltic countries. In France it abounds in the Vivara, in Langedoc, and Auvergne. The first glases of this kind appears to have been made in 1780 by a M. Ducros at the fuggestion of Chapital, who almoft melted some of this basalt without addition in a glas-pot, and formed of it two very light, black, or rather deep yellow, thinning, perfect bottles. In subsequent trials by another artiz, a mixture of equal parts of basalt and fand was employed, as preferable to the basalt alone; but notwithstanding a considerable demand for bottles of this ma-terial, the manufacture was abandoned for want of uniformity in the ingredients, which made them often fail. The colour of this glases 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 fea-fern, which enter into its compofition. This glas affords an infalce of a femipellucid fubftance, which exhibits a blue colour by incident light, and a yellow or orange colour by that which is transmitted. See Delaval on the caufe of the permanent colour of opaque bodies.

Glass, Plate, is the most perfect and beautiful glases, of which all the kinds of mirrors and looking-glasses are com-posed. The materials of which this kind of glases is made are much the fame as those of other works of glases, viz. an alkali falt, and fand.

To prepare the falt, they clean it well of all foreign ma-teries; pound or grind it with a kind of mill, and finally fift it pretty fine.

Pearl-ashes, properly purified, will furnish the alkali falt requisite for this purpofe: but it will be neceffary to add borax, or common falt, in order to facilitate the fution, and prevent the glases from flifitting in that degree of heat, in which...
which it is to be wrought into plates. For purifying the pearl-ashes, dissolve them in four times their weight of boiling water, in a pot of cast 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 ashes are left perfectly dry. Prefer them in stone jars, well secured from air and moisture.

Pearl-ashes may also be purified in the highest degree, so as to be proper for the manufacture of the most transparent glasses, by pulverizing three pounds of the best pearl-ashes, 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 exposing 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 over the fire till the ashes be entirely melted; let it then stand, cool, and filter it through paper in a pewter callender. 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-ashes, 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 it in the annealing furnace for about two hours; in which time the matter becomes very light and white; in this state they are called frit, or fritte; and are to be laid up in a dry 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 some of the fragments or shards of old and ill made glasses; taking care first to calcine the shards by heating them red-hot in the furnace, and thus casting them into cold water. To the mixture must likewise be added manganeze, to promote the fusion and purification.

The bell composition for looking-glass plates is said to consist of sixty pounds of white sand, cleansed, twenty-five pounds of purified pearl-ashes, fifteen pounds of salt-petre, and seven pounds of borax. If a yellow tinge should affect the glass, a small proportion of manganeze, mixed with an equal quantity of arlene, should be added. An ounce of the manganeze may be first tried: and if this proves insufficient, the quantity should be increased.

A cheaper composition for looking-glass plate consists of sixty pounds of the white sand, twenty pounds of pearl-ashes, ten pounds of common frit, seven pounds of nitre, two pounds of arlene, and one pound of borax.

The materials of the finest plate glasses, such as that of French manufacture, are white sand, soda, and lime, to which are added manganeze and zaffre, or any other oxyl of cobalt for particular colouring purposes. The sand is of the finest and whitest kind, which should be previously passed through a wire sieve, moderately close, into water, in which it should be well stirred about and washed. The sharpest 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 soda, which is preferable to potash, as glasses made with soda are found to be softer and to flow thinner when hot, and yet to be equally durable when cold. Besides, the neutral salts with the bulky of soda which confitute the glass in this instance, such as the muriat and sulphate of soda, appear to be dissolved more readily by the fire than the corresponding salts of potash. The soda that is used is considerably pure, or such as is separated from the rough ashes of harissa, and other soda plants by lixiviation. Lime adds to the fineness of the other materials, supplying the use of lighthouse in the fine-glasses; but excess of it would impair the colour and solidity of the glass. About 1-15th of the whole is as much as can properly be used; but some reduce the quantity to 1-24th. The decolouring substances are azure, or cobalt blue, and manganeze. Besides these, there is always a great quantity of the fragments of glasses, collected from the walls of the manufacture, which are made friable by quenching in water when hot, and used in this state together with the fresh materials. As to the quantities and proportions of the ingredients, much latitude is allowed. The following are said to produce a very fine glass; viz. 300 lbs. of sand; 200 lbs. of soda; 55 lbs. of lime; 32 ozs. of manganeze; three ozenes of azur; and 300 lbs. of fragments of glasses. In the manufacture at St. Gobin the purity 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 manganeze are first mixed together with more care than for ordinary glasses, and they are sifted 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 glasses 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 fit 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-glass plates. The work-houses, furnaces, &c. used in the making of this kind of plate-glasses are the same, except that they are smaller, and that the earthen-ware are disposed in a large covered gallery, opposite the furnace, as tho’ 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 his blowing iron, six feet long, and two inches in diameter, sharpened at the end, which is put in the mouth and covered 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 constantly turning it. He then blows 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 sprinkles the end of the tube to which the matter adheres, with water, still turning it, that by this cooling, the matter may coalesce with the tube, and be fit for finishing a greater weight. He dips the tube again into the same 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 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 shapes the matter to the length; which, by repeating this operation several times, affinches the form of a cylinder, terminating like a ball at the bottom, and in a point at the top. The afflent is then placed on a floor three feet and a half high, and on this floor there are two
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upright pieces of timber, with a croft beam of the same, for supporting the glass and tube, which are kept in an oblique position by the affidavit, that the mather workman may with a punchen set in a wooden handle, and with a mallet make a hole in the mafs; this hole is drilled at the centre of the ball that terminates the cylinder, and is about an inch in diameter. When the glass is pierced, the defects of it are perceived; if it is tolerably perfect, the workman lays the tube horizontally on a little iron treffel, 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 scissors, extremely sharp at the end, widens the glass, by infusing the scissors in the hole made with the punchen, whilst the affidavit, mounted on the floor, turns it round, till, at half, the opening is so large as to make a perfect cylinder at bottom. When this is done, the workman lays his glasses upon the treffel, at the mouth of the furnace, to heat it; he then gives it to his affidavit on the floor, and with large scissors cuts the mafs of matter up to half its height. There is at the mouth of the furnace an iron tool, called pontil, which is now heated, that it may unite and coalesce with the glass just cut, and perform the office in which the tube did before it was separated from the glass. 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 glass, about four inches thick. This red-hot pontil is presented to the diameter of the glass, which coalesce immediately with the matter round the pontil, so as to support the glass for the following operation. When this is done, they separate the tube from the glass, by striking a few blows with a chisel upon the end of the tube, which has been cooled; so that the glass breaks directly, and makes this separation, the tube being discharged of the glass now adhering to the pontil. They next present to the furnace the pontil of the glass, laying it on the treffel to heat, and redden the end of that glass, that the workman may open it with his scissors, as he has already opened one end of it, to complete the cylinder; the affidavit holding it on his floor as before. For the last time, they put the pontil on the treffel, that the glass may become red-hot, and the workman cuts it quite open with his scissors, right over against the fore-mentioned cut; this he does as before, taking care that both cuts are in the same line. In the mean time, the man who looks after the carquasses, comes to receive the glass 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 towards the handle of the shovel. Upon this the glass is laid, flattening it a little with a small flack a foot and a half long, so that the cut of the glass is turned upwards. They separate the glasses from the pontil, by striking a few gentle blows between the two with a chisel. The glass is then removed to the mouth of the hot carquasse, 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 glass, to unfold it out of its form of a flattened cylinder, and render it smooth, by turning it down upon the hearth of the carquasse. The tool, already descried, being immersed within the cylinder, performs this operation, by being pushed hard against all the parts of the glass. When the glass is thus made quite smooth, it is pulled to the bottom of the carquasse, or annealing furnace, with a small iron raker, and raised there with a little iron hook. When the carquasse is full, it is stopped and cemented as in the case of run glasses, and the glass remains there for a fortnight to be annealed; after which time, they are taken out to be polished. A workman can make but one glasses in an hour, and he works and rolls for six hours alternately.

It may be observed, that looking-glasses, thus blown, should never be above forty-five, or at most fifty inches long, and of a breadth proportionable. These exceeding these dimensions, as we frequently find among the Venice glasses, 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 manufactured by casting.

Casting or running large looking-glass plates. This art, as we have observed in the History of Glass, is of French invention. It is owing to the Sieur Abraham Thewart, who first propitiated it to the court of France, in 1688.

It is performed much like the casting of sheet-lead among the plumbers; and by means hereof we are not only enabled to make glasses of more than double the dimensions of any made by the Venetian way of blowing; but also to call 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 those for annealing the glasses, when formed, are much more so. 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 carquasses; each carquasse has two tills, or apertures, to put in wood, and two chimneyes. Add, that beside the annealing furnaces, &c. there are others for making of frit, and calcining old pieces of glasses.

All these furnaces are covered over with a large lid; under which are like wise forges, and work-houses for smiths, carpenters, &c. continually employed in repairing and keeping up the machines, furnaces, &c. as also lodges, and apartments for the workmen, and the other workmen, employed about the glasses, and keeping up a perpetual fire in the great furnace; so that the glass-houses, as that in the castle of St. Go-bin, in the forest of Pere, in the Soiflonois, appears more like a little city, than a manufactory.

The inside of furnaces is formed of a feet of baked earth, or refractory clay, proper to fulfill the action of fire; and the fame earth serves also for melting-pots, cisterns, &c. The furnaces seldom last above three years; after which they are to be rebuilt, from bottom to top, and to keep them good, even for that time, the inside must be refitted every six months, at which time the fire is extinguished. 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 inverted and truncated cone. The cisterns, or pans, called "euvettes," are much smaller, being about thirty-six inches long, eighteen inches wide, and many deep; and serve for the conveyance of liquid glasses, which is drawn out of the pots to the casting tables. They do not contain much more than a sixth, or when large plates are cast, a third of the pots.

When the furnace is in condition to receive the pots and cisterns, 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 brightest flame, without much refrums smoke, is preferred. This done, they fill the pots with the materials, or fosa and sand, which is done at several times, to facilitate the fusion. When the matter is sufficiently vitrified, refined, and settled, which usually happens in thirty-
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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 a proper height; and thus conducted to the table where the glais 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 glais is to be run, is of smooth thick copper-plate, about ten feet long, and fix feet broad. It is supported on a wooden frame, with truckles, for the convenience of removing from one carquaise, or annealing furnace, to another, in proportion as they are filled.

Or, when each pot has a caiing 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 glais, when cast and sufficiently cooled, may be slid 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 cuvettes or cisterns are withdrawn. When the glais is melted and fixed in the manner already stated under the article Flint Glass, the cuvette 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 stay 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 cuvette is pulled out and removed to the side of the copper table. It is then returned with an instrument consisting of a copper blade set in iron, and horsed for the discharge of its contents on the table, in the manner already mentioned.

To form the thickness of a glais, 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 roll the two extremes of a kind of roller, or hollow heavy cylinder of copper, turned after being cast, and about five 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 glais, and retain the matter, that it does not run off at the edges. The waste glais, 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 glais is come to a consistence, examined by the directors of the manufacture, and approved, they shove 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 carquaise, who, with iron hooks, pull the glais to them, and range it in the carquaise, which holds fixed large glais.

What is most surprising throughout the whole of this operation, is the quickness and address with which such many cisterns, filled with a flaming matter, are taken out of the furnace, converted to the table, and poured on it, the glais spread. It. 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 employ as before. This they continue to do, so long as there are any full cisterns; laying as many plates in each carquaise 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 carquaises, or annealing furnaces, must first have been 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 glaises, which is performed in eighteen hours, being an hour for each glais. 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 glais remains, which otherwise would grow green by continuance of fire, and spoil the glaises. 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 tilters, or percons employed for that purpose, in their shirts, run round the furnace without making the least stop, with a speed scarse 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 tillator, 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.

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 he fit to run glais, costs above three thousand and one hundred pounds; that at least six months are required for the building it anew, and three months for the retouching it; and that when a pot of matter bursts in the furnace, the loss of matter and time amounts to above two hundred and fifty pounds.

The glais, when taken out of the melting-furnace, needs nothing farther but to be ground, polished, and polished. But before these operations are performed, they cut and square the edges of the plates; which is performed with a rough diamond, pulled along the surface of the glais, upon a square ruler, like that of the glaisers, and made to cut into the substance of the glais to a certain depth. This cut is then opened by gently knocking with a small hammer on the under side of the glais, 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.
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Looking-Glass.

Glass, Annealing or Nealing of. The operation of annealing of glases is performed in a peculiar furnace called the anneal, which consists of two parts, the tower and hearth. 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 pan, called a frakter, by an operator called the hard-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 Neri, p. 243, seq.

This annealing is generally performed in a hot chamber, built for the purpose, at the top of the glases-house, above the crucibles, and a little below the chimney. Without this precaution, the glases would be liable to fly and break, by the least change of heat and cold, by the smallest scratch, and sometimes without any apparent external cause. The hard glases, and those especially that are made with alkali and earths, require much more annealing than the softer and more fusible glases, containing in their composition much litharge.

The particles of glases by annealing are supposed to lose part of their springiness, and their brittleness at the same time. A gradual heating or cooling of glases, according to Dr. Hook, anneals or reduces its parts to a texture more loose, and can to be broken; but withal more flexible than before. And hence in some measure the phenomena of glases drops.

Some of the phenomena depending on the fragility of unannealed glases deserve the attention of the curious. Those of the lacrymæ, or glases-drops, were among the first taken notice of; and it has also been observed, that hollow bells made of unannealed glases, with a small hole in them, will fly to pieces by the heat of the hand only, if the hole by which the internal and external air communicate be stopped with a finger. Phil. Trans. No. 477. § 3. See Rupert's Drops.

But lately some vessels made of such unannealed glases have been discovered, which have the remarkable property of refilling very hard brokes given from without, though they shiver to pieces by the shocks received from the fall of very light and minute bodies dropped into their cavities. Of this kind is the "Bologna phial." These glases may be made of any shape; all that needs be observed in making them, is to take care that their bottoms may be thicker than their sides. The thicker the bottom is, the easier do the glases break. One whole bottom is three fingers breadth in thickness, filled with as much eafant leaff as the thinnest glass. Some of these vessels have been tried with brokes of a mallet sufficient to drive a nail into wood tolerably hard, and have resist'd fracture. They also refill the shock of several heavy bodies let fall into their cavities, from the height of two or three feet. For instance, market-balls, pieces of iron, or other metal; pyrites, jasper, wood, bone, &c.; but this is not surprizing, as other glases of the same fize do the fame. But the wonder is, that taking a flierten of flint of the fize of a small pea, and letting it fall into the glases only from the height of three inches, in about two seconds the glasa flies, and sometimes in the very moment of the shock; any a bit of flint, no larger than a grain, drop into several glases successively, though it did not immediately break them, yet they all flew, being set by, in less than three quarters of an hour. Phil. Trans. ibid. p. 509.

Some other bodies produce a like effect with flint: for instance, sapphire, porcelain, diamonds, hard tempered iron, as also marbles, such as boys play with; to which add pearls from the animal kingdom.

The experiment succeeded also when the glases were held in the hand, reflect on a pillow, put in water, or filled with water. It is also remarkable, that the glases 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 glases 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 glases, 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 fliver of flint, equally cause this concussion, and break the glases?

Mr. Euler has endeavoured to account for these appearances from his Principles of Percussion. He thinks this experiment entirely overthrows the opinion of those who measure the force of percussion by the vis viva; and he thinks the principles he has established give a clear solution of this phenomenon. According to these principles, the extreme hardnes of the flint, and also its angular figure, which makes the space of contact with the glases veffel extremely small, ought to cause an impression on the glases vastly greater than lead or any other metal; and this may account for the flint's breaking the veffel, 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 fliver of flint weighing about two grains, though they had refilled the shock of a musket ball from the height of three feet. Phil. Trans. ibid. p. 515.

"The specific mechanical cause of this disposition to crack in unannealed glases, is very difficult to explain," says Aikin (Dià.), "but generally speaking, it is suppos'd to be the forcible contraction of the outer part by fuddled cooling, whilft the inner portion is still soft and half-fluid, fo that the whole fixes with a permanent strain or inequality of preffure, on one part upon the other; and as glases is extreme-ly elaftic, though brittle, any force which teares ofnder a portion, however small, of the teafe part, communicates a strong and fudden impulfe over the whole mafs." "This mott singular phenomenon," (of the Rupert's drop) says the fame ingenious chemist, in confequence of his own experiments, "is obviously owing to some permanent and very strong inequality of preffure, for when they are heated fo red, as to be loft and merely let to cool of themselves, this property of bufting is entirely loft, and, at the fame time, the specific gravity of the drop is increas'd. The peculiar brittlenes 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 flies in a direction different from what was intended, or the glases entirely breaks.

Among other more common defects of glases, we may mention its liability to be acted upon by corrosive liquors, as is the case when too much fulminate has been used. As imperceptible as glases is to the common meultrums, 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. Borrichius 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 glafs urns, or lacrymatories. The glafs of these had no holes made in it, as our old glafs in chamber-windows has, but still retained its smooth surface and transparency; but it was split into a vast number of thin laminae, which were as pellucid and fine as Muscovy glafs; 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 glafs; 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 glafs of the fame kind, in any form, would have done the fame. Borrich, de Ortu Chemicz.

There are other visible imperfections in glafs, materially injuring its foundness and beauty, and enumerated by Aikin (Dict. art. Glafs) under the denominations of friza, threads, tears, and knots. The former are undulating waves in the glafs, arising from the imperfect mixture of the materials, and their different specific gravities. Accordingly, we may observe, that the most transparent glafs 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-glafs which he uses is peculiarly subject to small veins, that disturb the rays entering 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 glafs, as appears from their image received on white paper, when the glafs is hold 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 glafs, and this bright line is defined by a dark edge on each side. But the bright line evidently shows a convergency of rays, which can only be effected by the veins being denser than the medium in which they are placed. The reason why flint glafs is more subject to veins than other glafs is, says the translator of Macquer's Chemical Dictionary, because it is compos'd of materials of more different densities.

Mr. Macquer, with a view of improving the manufacture of this glafs, proposes to facilitate the union of the calx of lead and sand, of which it is compos'd, by depriving the calx of lead, as much as possible, of its phlogiston, which may be done by combining the vitriolic acid with nitre, or red-lead, and exposing this composition to the operation of fire, to difengage it from the acid; and also by giving these two substances the greatest possible degrees of fluidity and mobility, which may be done by mixing with the composition of them a considerable quantity of solvents. Hill. Acad. Science, for 1773.

Threads in glafs, are those fleery filaments which arise from the vitrification of the clay; being generally green, and rendering the glafs more liable to crack at these parts. But one of the worst defects (says Aikin, uti supra), is tears, or drops of vitrified clay falling down from the furnace into the pots, and entangled with the glafs. Articles made of glafs with this defect, are always very brittle, and generally break of themseles by slight changes of heat and cold. Small bubbles appear in glafs not sufficiently refined by a continuance of the melting heat; and these may be owing to a deficiency of flux, so that the glafs is less fusible, and the bubbles cannot easily be disengaged. "Hence," says the author now cited, "the soft fusible glafs with much lead are much liable to this fault than the hard, green bottle-glafs, which is made only of alkali and earth." The last in glafs "are either from a portion of sand that has escaped vitrification, and remains entangled in the glafs, or from a remaining quantity of glafs-gall; or from bits of the crucible which may be accidentally knocked off by the iron instruments used in the working."
hard of shining: for, in this case, the strong fire will destroy
the colouring substance before the glass melts, and he has
found the following compositions to be nearly the best: viz.
face two parts, alkali three parts; or find two, alkali
three, calcined borax one; or, instead of alkali, two, alkali
two, calcined borax one: and though salt-petre is hardly
used at all, or very sparingly, for yellow glasses, as
it too much volatilises 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 glass 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
colours, 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 same degree of colour in the glass.
Nor does the fluidness or stickiness of the wet appear to be in
any respect necessary.

Gold-coloured spangles may be diffused through the sub-
fstance of glasses, by mixing the yellow tinctures with powdered
glasses, and bringing the mixture into fusion. See Lewis’s
Com. Phil. Techn. p. 222, 626, &c.

Glass for counterfeiting lapis lazuli. See Lapis Lazu-

Glass resembling gold. See Orf. and G M s.

Glass, Ruby. The way to give the true fine red of the
ruby, with a fair transparence, to glasses, is as follows. Cal-
cine in earthen vessels gold dissolved in aqua regia, the men-
struum being evaporated by distillation, more aqua regia added,
and the abstraction 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 skillful crystal-glass,
and purify it, by often canceling it into water; and then add,
by small quantities, enough of this red powder to give it
the true colour of a ruby, with an elegant and perfect tran-
sparence. Neri. See Gems.

The process of tinging glasses and enamels by preparations
of gold, were first attempted about the beginning of the 17th
century. Libavius, in one of his tracts, entitled Alchemia,
printed in 1626, conjectures that the colour of the ruby pro-
cedes from gold, and that gold dissolved, and brought to red-
fens, might be made to communicate a like colour to facitious
gems and glasses. On this principal Neri, in his "Art of Glafs," dated 1611, gives the process above rectified. Gla-
aber, in 1648, published a method of producing a red colour
by gold, in a manner which is of the vitreous kind, though not
perfect glases. For this purpose he ground powdered flint or
sand with four times its weight of fixed alkaline salt; this
mixture melts in a moderately strong fire, and when cold
looks like glass, but exposed to the air runs into a liquid
state. On adding this liquor to solution of gold in aqua regia,
the gold and flint precipitate together in form of a yellow
powder, which by calcination becomes purple; by mix-
ing this powder with three or four times its weight of the
alkaline solution of flint, 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 nevertheless
is soluble in water, or by the moifure of the air, on ac-
count of the redundancy of the salt. The honourable Mr.
Boyle, in a work published in 1682, mentions an experiment,
in which a like colour was introduced into glasses without
fusion; for, having kept a mixture of gold and mercury in
digression for some months, the fire was at last immediately
increased, so that the glass burst with a violent explosion;
and the lower part of the glasses 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 Skep-
tical Chemist.

About the same time Caffius is said to have discovered the
preparation of gold by tin, and that glasses might be tinged of
a ruby colour by melting it with this precipitate: though
he does not appear, says Dr. Lewis, from his treatise 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
glasses. See Gold precipitate with tin.

This process was soon after brought to perfection by
Kunckel; who says, that one part of the precipitate is sufficient
to give a ruby colour to 120 or parts of glasses, and a feitible
red to upwards of 1500 parts; but that the success is by
no means constant. Kunckel also mentions a purple-gold
powder, resembling that of Neri, which he obtained by ini-
nitrating solution of gold to dryness, abstracting from it
fresh aqua regia three or four times, till the matter appears
like oil; then precipitating with strong alkaline leys, and
washing the precipitate with water. By diffusing this pow-
der in spirit of salt, and precipitating it again, it becomes,
he says, extremely fair; and in this state he directs it to be
mixed with a due proportion of Venice glasses.

Orfekl in his treatise entitled Sol solm Velle, gives the
following process for producing a very fine ruby. He di-
 rects the purple precipitate, made by tin, to be ground with
fix times its quantity of Venice glases 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 borax, nitre, and fixed alkaline salt, and
times as much calcined flint of each of the salts; but he
gives no directions as to the proportion of the gold precipi-
tate, or mode of fusion. Heliot describes a preparation,
which mixed with Venice glases, was found to give a beau-
tiful purple enamel. This preparation consists of equal parts
of solution of gold, and of solution of zinc in aqua regia,
mixed together with the addition of a volatile salt pre-
pared from sal ammoniac in quicksilver, in sufficient quantity
in order to precipitate the two metals. The precipitate is then
gually heated, till it acquires a violet colour. However,
though a purple or red reed, approaching to that of ruby,
may, by the methods above rectified, be baked on glasses or
enamels, and introduced into the mass by fusion, the way of
equally diffusing such a colour through a quantity of frit
or glass is still, says Dr. Lewis, a secret. The following pro-
cesses for making the ruby glasses was communicated to Dr.
Lewis by an artist, who ascribed it to Kunckel. The gold
is directed to be diffused in a mixture of one part of spirit
of salt, 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 solution of gold being properly diluted with water (see
GOLD precipitate, &c.) the solution of tin is added, and
the mixture left to stand till the purple matter has settles to
the bottom. The colourless liquor is then poured off, and
the purple sediment, while moist and not very thick, is thorou-
ghly mixed with powdered flint or sand. This mixture is
well ground with powdered nitre, tartar, borax, and arsene, and
the compound melted with a suitable fire. The proportions
of the ingredients are 2560 parts of sand, 384 of nitre, 240 of
tartar, 240 of borax, 28 of arsene, 5 of tin, and 5 of
gold. Lewis’s Com. Phil. Techn. p. 171, 621, &c.

Glass, white-opaque, and semi-transparent, may be made of
ten pounds of either of the compositions for hard glasses, and
GLASS.

One pound of well calcined horn, ivory, or bone; or an opaque whiteneifs may be given to glasses, by adding one pound of very white arsenic to ten pounds of flint glass. Let them be well powdered and mixed, by grinding them together; and then fused with a moderate heat, till they are thoroughly incorporeted. A glass of this kind is made in large quantities at a manufactury near London, and used only for differant kinds of vessels, but as a white ground for crystal in dishes, plates and snuff-boxes, which do not require finishing 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 vesels of glasses, may be coloured within, so as to imitate the semi-opaque gems. The method of doing it is this: make a strong solution of ichthyocolla, or safas, in common water, by boiling; pour a quantity of this warm into the hollow of a white glass vesel; shake it thoroughly about, that all the fides may be wetted, and then pour off the rest of the moisture. Immediately after this, throw in red lead, shake it and turn it about, throw it into many places with a tube, and the moisture will make it stick and run in waves and pretty figures. Then throw in some of the painter's blue earth, and make it run in waves in the ball as the red-lead; then do the same with verdigris, next with orpiment, then with red lake, all well ground; always casting in the colours in different places, and turning the glass, that the moisture within may run them into the waves. Then take fine plaster of Paris, and put a quantity of it into the ball; shake it also nimby about; this will even when fick firmly to the glasses, and give it a strong inner coat, keeping all the colours on very feaily and strongly.

These are set on frames of carved wood, and much embellished as ornaments in many places. Neri.

Glass-strops. See Rupert's glass.


Glass-gall, or sandiver, is the flour of the glasses pots, which arises during the vitrification of the frit. See Glass, super.

Glass, gilding of. See Gilding of enamcl and glasses.

Glass, grinding of. See Grinding.

Glass-house Furnaces, is the place in which the ingredients or materials of glasses are fused and vitrified. There are three kinds of furnaces used in the glass-marts. The firt, called the "calcur," serves for preparing or calcining the frit. It is made like an oven, 10 feet long, seven 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 glasses is made. Its figure is round, resembling a domed, three yards in diameter, and two high, supported on arches, beneath which is a large space for a brick and copious draught of cold air from without: round the inside there are arranged eight or more pots, on these piling-pots, every where chould except at one side opening, which communicates with a small recess formed by the alternate projections of the masonry and lines of the oven or kiln, which rests on the stone-bench. The furnace has two partitions; the lower, terminating the pots from the fire-places, has a circular hole in the centre covered with a grate, through which the fames pass from the fire-place into the furnace, being afterwards reverberated from the arches fides and roof to the melting-pots, and passing out with the fume through the top of the dome, which is lengthened into a chimney for the space of a few feet. The second partition divides this from the hearth or annealing furnace; through the beccas, or working holes, when there are more than one, the metal is taken out of the pots, and the pots put into the furnace; these beccas are stopped with moveable covers, made of slate and brick to screen the eyes of the workmen from the fire; and sometimes on each side of the becca is a round end, out of which coloured glasses, or finer metal is taken from the piling-pot. To the furnace likewise occasionally belong ovens, or holes near the hearth, for the calcining of tartar, iron, &c.

The hearth, which furnishes to anneal and cool the vessels, and which Agricola makes a particular furnace, consists of a tower, before the becca; the hearth lies directly over the melting furnace, with a partition between them about a foot thick, having an aperture called "cella," or "fumella," through which the flame or heat ascends out of the furnace into the tower; or on the floor or bottom of this tower, the vessel, fashioned by the artist, is set to be annealed; and as the flame has here a less degree of intensity than that which is fertilized by the pots, the vessels, after they have been formed, cool slowly and gradually. This has usually two beccas, or mouthes, by which the glasses are put in with a fork, and placed on the floor. The hearth is an avenue, five or six yards long, continued to the tower; through this the glasses, when annealed, are drawn in iron pots, called scrapes, by which they come to cool by degrees, being quite cold at the time they reach the mouth of the hearth, which enters the "farcilo," 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 cooking the glasses. The metal is wound on two opposite sides, and on the two others they have their Calcs, into which are made linnet-holes for the fire to come from the furnace, to bake the frit, and also to discharge the flame. Fires are made in the arches to anneal the vessel, so that the whole process is done in one furnace.

The materials with which the inside of these furnaces are constructed are not ordinary brick (which would soon melt down into glasses, as would also all the other fumes,) but hard and sandy kinds, called by Imperators "pyramida." But when bricks are used, they should be formed of an earth which coalesces in the highest degree the qualities of density and inertibility, for retaining the fire, which continues to act upon them, without combustion for a long time; as the fires in a glass-house are seldom suffered 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 glass made with the addition of a large quantity of lead, of great use in the art of making counter-gems. The method of making it is thus: 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, lumpy powder; then spread it in the kiln, and give it a greater heat, continually stirring it, and by frequent passages into lamps, continue this several hours, till the powder becomes of a yellow, and 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 cool the whole, which will be now perfectly melted, into water; separate the loose lead from it, and return the metal into the pot; and after standing 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 ceraüs, or white lead, minimum, litcharge, and all the other preparations and colours of lead, are easily fused by a moderate fire, and formed 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, i.e. minimum, and other parts of fand, 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 fand. This glass of lead has a considerable specific gravity, and its lowest part is always the heaviest. It is an important flux in the alloys of ores to facilitate their scorifications.

Glas 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 poverine frit twenty pounds, lead calcined sixteen pounds; sift both the powders very fine; then melt them into a glas, separating the unmixed lead, by plunging the mass in water; after this return it into the pot, and add brass threes calcined fix ounces, and one penny-weight of crocus martis made with vinegar; put this in at six different times, always carefully mixing it together; let it finally settle 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 brass the same quantity of the caput mortuum of the vitriolum veneris be used, the green is yet much finer.

For topaz-colour take crystal frit fifteen pounds, calcined lead twelve pounds; mix them well together, by siftting the powders through a fine sieve; then let them in a furnace not too hot, and separate the superfluous unmixed lead, by calling the whole into water; repeat this twice; then add half gold yellow glas, and let them incorporate and purify, and they will be of the true and exact colour of the original topazes.

For sea-green, take crystal frit sixteen pounds, calcined lead ten pounds; mix them well together, and let them in a pot in a furnace; in twelve hours the whole will be melted; then call it into water and separate it from the loose lead; put them into the furnace again for eight hours; then separate the loose lead by washing a second time, and return it to the pot for eight hours more. Neri. See Gems.

Glass, Painting in. The primitive manner of painting in glas was very simple, and of consequence very elegant; it consisted in the mere arrangement of pieces of glas of different colours, in some fort 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 raked with all their nuances, their whole address went no farther than to the drawing of the contours of the figures in black, with water colours, and hatching the draperies, after the same manner, on glases of the colour of the object intended to be painted. For the carnations, they chose glases of a bright red; upon which they designed the principal lineaments 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 adorning of churches, basilicas, &c. they found means of incorporating the colours with the glas itself, by exposing them to a proper degree of fire, after the colours had been laid on.

A French painter at Marfilles 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 glas are very different from those used either in painting in oil, or water.

The black is made of two-thirds of flakas, or scales of iron, beaten up, and mixed with another third of rocaile, or little glas beads. White, with fand, or little white pebbles, calcined, pounded in a mortar, and afterwards ground on marble; with one fourth-part of salt-petra, added thereof, and the mixture calcined and pulverized over again: to which, when they are ready to use it, is added little gypsum, or plaster of Paris well ground, &c. For yellow, they use lead-silver ground, mixed up in a crucible, with sulphur or salt-petra; 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 litharge of silver, and scales of iron, gum Arabick, feret, glas-beads, and blood-ore, 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 azutum, one ounce; as much black lead, and four ounces of white fand, incorporated by the fire. After calcination, they add a fourth part of salt-petra: after a second calcination, a sixth part more: after which they make a third coction before it is used. Aures, purple, and violeta, are prepared like green, only leaving out the azutum, and in the lien thereof using sulphur for azure; perigueux for purple; and both these drugs for violet. Carnations are made of feretta and rocaile. And lastly, colours for the hair, trunks of trees, &c. are made of feret, rocaile, &c.

This account of colours we have from M. Felibiens excellent work Des Principes d'Architecture, &c. though it must be owned, that all the painters on glas do not use them; there being few artists of that kind but have invented their own particular ones, whereas they usually make secret colors. But this is certain, that those above described are sufficient for the best paintings of all sorts; provided the perfon 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 esteemed 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 seies of profilers to the present time. Among the later proficients in this art were Isaac Oliver, who painted the windows at Christchurch, Oxford, in 1709; William Price, who in the same year painted the windows in Merton chapel; William Price, the fon, to whose art we owe the windows at Queen's, New-college, and Maudlin, of whom Mr. Walpole says, that his colours are fine, his drawing good,
GLASS.

good, and his taste in ornaments and Mosaic far superior
to any of his predecessors, and equal to the antique.
In 1761, Mr. Pateron, an antiquary late of Exell-house
in London, exhibited the two first auctions of painted glases
imported from Flanders; and undertook also to establish a
manufacture of painted glases: several of the pieces of this
ingenious artist exhibited colours vying in perfection with
the old paintings.

Thefe beautiful works, among the painters in glases, which
were made in the glase-house, were of two kinds: in some,
the colour was diffused through the whole body of glases;
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 lefs,
according to the nature of the colour; the yellow being al-
ways found to enter the deepest.

Thefe last, though not fo strong and beautiful as the
former, were of more advantage to the workmen: becaufe,
on the fame glases, though already coloured, they could
now other kinds of colours, where there was occasion to embroider
draperies, enrich them with foliages, or repreff other or-
naments of gold, silver, &c.

In order to this, they made ufe of emery; grinding, or
wearing down the surface of the glases, till fuch time as
they were got through the colour, to the clear glases: this
done, they applied the proper colours on the other side
of the glases. By this means the new colours were pre-
vented from running and mixing among the former, when
the glases came to be expos'd to the fire, as will hereafter
be fhewn.

When the intended ornaments were to appear white, or
filvered, they contented themselves to bare the glases 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 vivid colours on glases depends en-
tirely on the fame principles as painting in enamel; and
the manner of executing it is likewise the fame; except
that in this the transparency of the colours being indif-
penfibly requisite, no fubfiances can be ufed to form them
but fuch as vitrify perfectly; and, therefore, the great
object is to find a fett of colours, which are composed of
fuch fubfstances, as, by the admixture of other bodies,
may promote their vitrification and fufion; are capable of
being converted into glases; and melting, in that flate,
with lefs heat than is fufficient to melt fuch other kinds
of glases as may be cho'en for the ground or body to be
painted; to temper these colours, fo as to make them
proper to be worked with a pencil; and to burn or reduce
them by heat, to a due flate of fufion, without injuring
or melting the glaces which confiitutes the body painted.
The firft thing to be done, in order to paint on glases,
in the modern way, is to defign, and even colour, the
whole subject on paper. Then they make choice of pieces
of glases proper to receive the feveral parts, and proceed
to divide or diftribute the defign itself, or the paper it is
drawn on, into pieces suitable to thofe of glases; having
always a view that the glases may join in the contours
of the figures, and the folds of the draperies; that the
emotions and other finer parts may not be damaged by
the lead wherewith the pieces are to be joined toge-
ther.

The distribution being made, they mark all the glases,
as well as papers, with letters, or numbers, that they
may be known again; which done, applying each part
of the defign on the glases intended for it, they copy or
transfer the defign upon this glases, with the black colour,
diluted in gum-water; by tracing and following all the
lines and strokes, as they appear through the glases, with
the point of a pencil.

When these firft strokes are well dried, which happens
in about two days, the work being only in black and
white, they give it a glact wash over, with urine, gum
Arabic, and a little black; and this feveral times repeated,
according as the shades are defired to be heightened:
with this precaution, never to apply a new wash, till the
former is sufficiently dried. This done, the lights and
shadings are given, by rubbing off the colour in the refpe-
tive places, with a wooden point or the handle of the
pencil.

As to the other colours above-mentioned, they are ufed
with gum-water, much as in painting in miniature; taking
care to apply them lightly, for fear of effacing the out-
lines of the defign; or even, for the greater fecurity, to
apply them on the other side, efpecially yellow, which
is very pernicious to other colours, by blending the-
with.

And here too, as in pieces of black and white, parti-
cular regard must be always had, not to lay colour on co-
our, or lay on a new lay, till fuch time as the former are
well dried. It may be added, that the yellow is the only
colour that penetrates through the glases, and incorporates
therewith by the fire; the red, and particularly the blue,
which is very difficult to ufe, remaining on the surface,
or at leaft entering very little. When the painting of all
the pieces is finifh'd, they are carried to the furnace or
oven, to anneal or bake the colours. The furnace here
ufed is small, built of brick, from eighteen to thirty inches
square: at fix inches from the bottom is an aperture, to
put in the fuel, and maintain the fire. Over this ap-
erture is a grate, made of three fquare 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 coaction
goes forward.

On the grate is placed a fquare earthen pan, fix or seven
inches deep; and five or fix inches lefs, 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 defined for the
fame end.

In this pan are the pieces of glases to be placed in the
following manner: firil, the bottom of the pan is covered
with three ftrata, or layers of quicklime, pulverized;
thefe ftrata being feparated by two others, of old broken
glases: the defign whereof is to secure the painted glases
from the too intense heat of the fire. This done, the glases
are laid horizontally on the lab, or uppermost, layer of
lime.

The firil row of glases, they cover over with a layer of
the fame powder an inch deep; and over this they lay an-
other range of glases: 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, or on a fquare table of earthenware, closely luted
all round; only having five little apertures, one at each
corner, and another in the middle, to serve as chime-
neries.

Things thus disposed, there remains nothing but to give
the fire to the work. The fire for the two firft hours muft
be very moderate; and must be increased in proportion
as the coaction advances, for the space of ten or twelve
hours; in which time it is ufually completed. At laft,
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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 flares out at the chimneys.

During the first hours, they make affays from time to time, by taking out pieces laid for that purpose, through the little aperture of the furnace, and pan, to see whether the yellow 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 glasses. See Painting.

GLASS; painting on, by means of prints. 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 glafs. 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 glafs was first taken notice 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 glafs by heat. Neum. Chem. Works, by Dr. Lewis, p. 57.

The mixing of glafs reduced to powder, with other lefs easily vitrifiable substances for forming a paste, to be afterwards made into a fort of 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 glafs alone, and that with much less trouble, and without the reducing it to powder. By this art, vessels of glafs are changed into vevels of a fort of porcelain, without altering their form, and the meanest glafs made only of sand, lime, and flaine ashes, serves as well as the best for that purpose: our common coarse green quartz-bottles, or the great bell glafs with which gardeners cover their melons, &c. being by this means changeable into a beautiful white fort 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 charge, than that of baking a common vevel of our coarse earthen-ware; and for this reason the vevels of this fort of ware may be afforded extremely cheap.

It is very certain, that all porcelain ware is a suffibance in the flate of semi-vitrification; and in order to bring glafs, which is a wholly vitrifiable substance, into the condition of porcelain, there requires no more than to reduce it to a lefs perfectly vitrified flate.

The question which would naturally be started on this occasion, is, whether it be possible to reduce glafs to a lefs vitrified flate, it having already undergone what is esteemed the last change by fire. But when we consider, that the mats of antimony, the vitrifications of many of the metals, as the glafs of lead, and the counterfeit gems coloured by the metals, are more or lefs easily reduced again by chemicity to metals, &c. the reducing of sand, flints, &c. after they are vitrified, at least a little way back toward their native or primitive flate, may appear not wholly impracticable, and the attempts which M. Reaumur made on this occasion, were what gave him the first hints of the glafs-porcelain; called from his name "Reaumur's porcelain."

The method of making it is this. The glafs vevels to be converted into porcelain are to be put into a large earthen vevel, such as the common fine earthen dishes are baked in, or into sufficiently large crucibles; the vevels are to be filled with a mixture of fine white sand, and of fine gysph or glider-Rose burnt into what is called flatter of Paris; and all the interfaces are to be filled up with the fame powder: so that the glafs vevels may no where touch either one another, or the sides of the vevel, they are baken in. The vevel is to be then covered down and liuted, and the fire does the rest 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 vevels, it is to be taken out, and the whole contents will be found no longer glafs, but converted into a white opaque subflance, which is a very elegant porcelain, and has almost the properties of that of China. Memoirs Acad. Sciences Par. 1739.

The powder 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 caufe of this transformation, says Macquer, is probably that the vitriolic acid of the gypsum quits its hairs of calcareous earth, and unites with the alkaline flant and sialine earth of the glafs, with which it forms a kind of falt or saline, differing from the calcareous salines, by the interception of which matter the glafs 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 conclusions: 1. Green glafs cemented with white sand received no change in a heat below ignition: in a low red-heat, the change proceeded very slowly; but in a strong red-heat, approaching to whitening, the thickest pieces of glafs bottles were thoroughly changed in three hours. 2. The glafs sustained the following progression of changes. Its surface first became blue; its transparency was diminished, and when laid 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 subflance, externally full blackish: and as this change advanced, still further and farther within the glafs, the colour of the visible 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 thickest of the pieces: by degrees the glafs became throughout white and fibrous, the external bluefkins at the same time going off, and being succeeded by a dull whithit or dun colour: by a full longer continuance in the fire, the fibres were changed gradually from the external to the internal part, and converted into grains; and the texture then was not unlike that of common porcelain. The grains, at first fine and somewhat glossy, appeared afterwards larger and diller, and at length the substance of the glafs became porous and friable, like a mass of white sand slightly cohering. 3. Concerning the qualities of the converted glafs Dr. Lewis observes, that the whitenss of the internal part was not inferior to that of porcelain, but that its surface was the most 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 hardness became greater than that of glafs or of the common kinds of porcelain; it was capable of sustaining sudden changes of heat and cold better than any porcelain; and in a moderate white heat, it was friable into a subflance not fibrous, but vitreous and smooth, like white enamel: that when its texture had been carefully granulated, it was now much softer and unfultable; and, lastly, that when some coarsely granulated unfizable pieces which, with the continuance of a moderate heat, would have become porous and friable, 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, hardness, texture, or the regular succession of changes, from the use of different cementing substances; though
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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 sands and founds communicated different shades of a brown colour; and white earths gave whitish, greyish, or brownish tinges. White sand, calcined flints, and gypsum, gave in general the greatest whiteness, and tobacco-pipe clay the greatest glisnness and brightness. Glasses composed of earths without alkaline salt, glas of lead, flint-glas, crown-glas. looking-glas plates, a glass prepared with calcined flints and a fixed alkaline salt, and even green glas which had been fused together with a ninth part of alkaline salt, suffered none of the above alterations by cementation. Green bottles-glas and common window-glas were most susceptible of these alterations. 6. The changes produced by cementation could not proceed from any absorption of matter from the cementing substance; because no increase of weight was given, and became the same changes were produced upon a piece of glas merely by heat, without any cementing substance. See Com. Phil. Techn. p. 250—255.

Mr. Gregory Watt, in his valuable paper on basalt (Phil. Trans. for 1804, cited by Alken) alleges this porcellaneous change of glasses as an illustration of his important principle, viz. that bodies which have a natural tendency to a crystalline arrangement, or a polarity, when vitrified by a sufficient heat and cooked 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 basalt, he shows by the singular crystallizations formed in the cells of fused basalt, long after it had lost the liquidity of fusion. The circumstance of no material change occurring in the weight of glasses by this conversion into the fibrous state, he shows incontrovertibly 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 porcellanized in the same way, and again be melted into glas, and so on alternately." See Porcelain.

Glas-pots, the vessels in the glasses manufacture used for melting the glases. Those for the white glasses works are made of a tobacco-pipe clay, brought from the Isle of Wight, which is first well washed, then calcined, and afterwards ground to a fine powder in a mill; which being mixed 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 non-fuch, and another sort of clay from Staffordshire; they make these so large as to hold three or four hundred weight of metal. And besides these, they have a small sort called pluming pots, which they set upon the larger, and which contain a finer and more nice metal fit for the nicest works. Neri.

The clay that is used for this purpose should be of the purest and most refractory kind, and well censed from all sandy, ferruginous, and pyritic matters; and to this it will be proper to add ground crucibles, white sand, calcined flints duly levigated, or a certain proportion of the same clay baked, 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 fit. 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 he 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 solvent activity of the glasses with its powerful forces. They should also be made very thick and strong, as they are intended to last for many months. When milled, they are placed in a warm room in order to discharge their moisture, and any small fissures 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 glas materials. Pots of this kind are said to last, on 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 lump 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 glass is drawn out into threads.

It has been observed, that glasses tubes laid before the fire in an horizontal position, and with their extremities supported, have had a rotary 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 make 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 east to west; but if they lean to the left, the motion will be from west to east; 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 glass plane, 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 causes of these phenomena. It seems rather owing to the swelling of the tube towards the fire; for allowing such dwelling, 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, must fall down again, and so on successively; which will produce a rotary 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 supporters, will.
by their weight, pull downwards, and consequently force the middle part, resting upon its two props, upwards: and being left advanced towards the fire, as being heated, will, by their oblique situation, pull the middle part backwards also from the fire, which will cause a rotatory regressive motion, quite contrary to what the tube had when supported near its extremities. And when a single 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 rest, but pull it down till it coincides with a plane perpendicular to the horizon; and consequently, as new curves are generated, new motions will 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 justness of this reasoning is made manifest, by bending a wire, and supporting it first near its extremities, then near its centre on each side, afterwards inclining it to the right and to the left; the bending in every case representing the curved part of the tube next the fire. This solution of the phenomenon is rendered the more probable from hence, that when 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 increase of contact hinder the motion, because the plate of glass was so broad as to have a much greater contact with the tube, and yet both the rotatory and regressive motions were manifest.

These experiments succeeded best with tubes about twenty or twenty-five inches long; and the diameter about one-tenth of an inch; and they had in each a pretty strong pin fixed in cork, for an axis to roll with on the supporting tubes.

Phil. Trans. N. 426.

Glass receivers, how to cement the cracks of. See Cement and Receiver.

Glass, how to take the impression of antique gems in. See Gem.

The property which glass possessest in common with other substances of being expanded by heat, and contracted by cold, was long ago observed and evinced by Mr. Hook. See Birth's Hill of the Royal Society, vol. i. p. 411. See Thermometer.

Glass, Laws relating to. No glass shall be imported into Ireland, other than the manufacture of Great Britain, on pain of forfeiting the same, and ship, and 102 a pound. 19 G. II. c. 12. If any foreign glass shall be landed or unshipped before entry and payment of the duties, or without warrant from the proper officer, the same shall be forfeited, or its value; and the master or other person having command of the vessel, and every other person concerned in such landing or unshipping, shall forfeit 100l. 17 G. III. c. 39. And by 38 G. III. c. 33, for preventing the fraudulent importation of glasses, every package containing any plate or plates of glasses unframed, being plate, crown, or flute glasses, which shall be imported, or brought into this kingdom for exportation, shall be marked on the outside in Roman letters four inches long at least, with the word Glass, on pain of forfeiture, together with the package, and all goods contained in it. The matter of the vessel importing such package, shall, in reporting his cargo, express every such package of glasses, on pain of forfeiting the same, and also 100l. Nor shall any such package be imported, which shall not contain 500 weight, on pain of forfeiture; but not extending to any part of glasses 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 finer glasses, or enamelled, stained, or paste glasses, or phial glasses, shall be paid by the maker thereof 1l. 12s. 6d.; for every hundred weight of materials used in making spread window glasses, commonly called broad glasses, 8s. 2d.; for every hundred weight of materials used for making all other window glasses (not being spread glasses), whether flatted, or otherwise manufactured, commonly called crown glasses, or German fluted glasses, 1l. 4s. 6d.; for every hundred weight of materials used in making common bottles (not being phials), and of vessels used in chemical laboratories, and of garden glasses, and of all other vessels or utensils made of common bottle metal, 4s. 7d.; and for every hundred weight of plate glasses, and of all other glass manufactures, which shall be imported into Great Britain, the same not being flaked, in which wine or oil is imported, nor foreign green glasses bottles, nor Irish glasses, or glasses manufactures imported directly from Ireland, to be paid by the importer before the landing thereof, 2l. 2s. 2d. And any glassmaker shall take out a licence, for which he shall pay 5s., to be renewed annually ten days at least before the end of the year, on the penalty of 50l. 24 G. III. c. 41. 43 G. III. c. 69. The place of making glasses shall be entered, before the commencement of manufacture, and all work-houses, furnaces, pots, annealing arches, &c. shall be on pain of forfeiting 200l. 19 G. II. c. 12. 17 G. III. c. 39. 35 G. III. c. 114. Officers may enter and survey, and mark pots; and any person counterfeiting or altering such mark, or contriving at its being done, shall forfeit 500l.; or defacing, or causing to be defaced or obliterated such mark, incurs a forfeiture of 200l. 35 G. III. c. 114. Notice of beginning to work shall be given in writing, on pain of forfeiting 200l. 19 G. II. c. 12. And notice of filling every pot shall be given twelve hours before the operation is begun, on pain of 50l. 19 G. II. c. 12. 17 G. III. c. 39. Annealing arches are to be made of a certain form, and numbered, on pain of forfeiting 100l. Annealing arches are to be locked, except at certain times; and breaking such lock, &c. incurs a forfeiture of 200l. 35 G. III. c. 114. The same act comprehends several other provisions, enforced by certain penalties. Bottles are not to be removed till they are weighed, (penalty 100l.) which are to be kept separate from those that are unweighed, on pain of forfeiting 50l. No phials, &c. are to be made in places entered for making common glasses bottles, on pain of forfeiting 200l. Entry shall be made of the glasses manufactured every month within the bills, and elsewhere every six weeks, on pain of 20l. The maker, within the bills, shall, in four weeks, and elsewhere in six weeks after entry, pay off the duties, on pain of double duty. If glasses, shipped for exportation, shall be re-landed, it shall be forfeited, and every person concerned therein shall forfeit 100l. 17 G. III. c. 39. For the drawbacks on exportation of glasses, see 43 G. III. c. 69. Obstructing officers in curing the duties incurs a forfeiture of 50l. 19 G. II. c. 12. 17 G. III. c. 39. Penalties are appropriated, half to the use of the king, and half to him that shall sue.

Glass-Carrick Point, in Geography, a cape of Ireland, on the eastern coast of the county of Wexford. N. lat. 52° 35'. W. long. 6° 12'.

Glass-Cfes, in Gardening, a light fort of erection formed with glasses fences in proper framework, mostly upright in the front part and ends, but sloping at top from a back wall, or other convenient building, to the fore-part; the front, top, and both ends being of glass-work. The situation for this purpose should face the south, in order to have the full influence of the sun. Constructions of this nature are useful for protecting many sorts of curious tender plants in winter which want it only occasionally from severe frost, and other similar causes.

Buildings
GLASS.

Buildings of this kind may be constructed, occasionally, either against some ready-built south wall, which serves for the back, or all the other parts forward being wood-work and glafs; or detached in a similar situation, so that the whole front may blend to the south; the back being framed of brick-work, &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 or fix, to eight or 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 fix to seven or eight in the front, both ends in proportion with the top, sloping gradually, as just noticed, from the back, having an entrance, or door, in front, or at one end. The glafs-work should be made to slide readily backwards and forwards.

Sometimes fire-flies 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 different purposes.

These cafes, as mentioned above, are used as preparatory departments, in which to winter many sorts of curious exotics of the harder green-house kinds, which only want protection from severe cold, as well as many choice kinds of the open ground, which are rather tenderer in their minor growth, or may 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 glases; all which, being in pots, can be readily placed in this preparatory at the approach of severe weather, 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 seeing, to guard them from heavy or incessant rain, or cold night dews in autumn, which, in many forts retard, or sometimes wholly frustrate their production of good feed, as in many forts of curious tender annuals; particularly the fine double ballans, cock's-combs, tricolors, double flammoniums, diamond ficoides, 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, tricolors, double flammoniums, double-striped ballans, egg-plants, &c. the plants being first raised in hot-beds, under garden-frames, till of twelve or fifteen inches growth, then a hot-bed made in the glass cafe, earthed at top, and the plants in pots, finely plunged into the earth of it; the glases, in these cafes, should be shut 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 Plants.

These sorts of glass-cafes are also sometimes made use of as a kind of appertainances to hot-houses, or boxes, detached from them, having, as observed above, internal fluxes for fireheat, when necessary, serving as preparatory for many sorts of exotics, which are tenderer than common green-house plants, but do not require the constant full heat of the more tender hot-house kinds, but only the assistance of moderate fire-heat 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 efluent, either by means of an internal bark-bed, or fluxes for fire-heat.

When intended for this purpose, it is convenient to have both an internal pit for a bark-bed, and fluxes for fire-heat, in order to use either separately, or sometimes both, as may be found necessary. See Hot-House.

GLASS-FLACKS, in Mining, is a term for the polished surfaces, or sicken-fides, which are found in some of the mineral veins in Derbyshire, something like the polishing which is seen often on the sides of faults. See Slickenside.

GLASS FLAX, called also Stakelby, in Geography, one of the Hebrides, near the N.E. extremity of Harris. It is a small, low, round island, covered with heath, and indented by the sea. Near its western extremity are two good natural harbours, and on its east point a light-house was erected A.D. 1788. It lies at the entrance of East 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 allo 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 Meath, near a village of the same name, about five miles from the town of Meath. The lake contains 120 acres; and a wood, spreading over a fine bold hill, hangs down to the water in one deep thistle, 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, optical-glasses, looking-glasses, burning-glasses, &c.

GLASSES, Drinking, are simple vessels of common glafs or cryflal, usually made in form of an inverted cone. Each glas 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 expeditious 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 glases chiefly used in England are made of the ashes of fern; cryflal glases being less frequent in use. The exceeding brittleness of this commodity, notwithstanding the very rate of each glas, renders the consumption thereof very considerable. For the method of fudging the edges of drinking-glasses, see Gilding on Enamel and Glass.

GLASSES, Metallic, in Chemistry, are the oxyds, or sometimes the sulphured oxys of the different metals, vitrified by heat.

GLASSES, Optic, are those made use of to strengthen, improve, or preserve the Hght. See Optic Glasses.

GLASSES, Convex. See Convex.

GLASSES, Concave. See Concave.

GLASSES, Infernal. See Infernal.

GLASSES, Lenticular. See Lenses.

GLASSES, Meniscus. See Meniscus, &c.

GLASSES, Plain. See Plain Glass.

GLASSES, Plano-Concave. See Plano-Concave.

GLASSES, Plano-Convex. See Plano-Convex.

GLASSES, Telescop. See Telescope.

GLASSES, Object. See Object-Glases.

GLASSES, Eyes. See Eye-Glases.

GLASSES, Magnifying. See Magnifying.

GLASSES, Multiplying. See Multiplying.

GLASSES, Magical. See Aragonia.
GLASS, Persp. See Persp.
GLASS, Looking. See Looking-Glafs, MIRROR, and FOILING.
GLASS, Burning. See BURNING-Glafs.
GLASS, Weather. See Weather-Glafs.
GLASS, Calking. See CUPPING-Glafs.
GLASS, Windows. See Window and GLASS, j pan.
GLASS, Acts of a. See ANIS.
GLASS, Pole of a. See POLE.
GLASS, Hour. See Hour-Glafs.
GLASS, Tin. See BISNITH.
GLASS, Watch. See WATCH.
GLASS-Wor. See KALE.
GLASS-Worr, Berry-Bearing, in Botany. See ANARASIS.
GLASS-Wor. Jointed. See SALICORNIA and KELF.
GLASSHATTEN, or GLADTEN, 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 Glafs-houes, which are three hills, so called by captain Cook in 1770, situated in S. lat. 26° 28'.
GLASSHUTTEN, a town of Saxony, near which is a silver mine; 8 miles S. of Drefden.
GlaSSUS, 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 distinguished reputation. He was appointed superintendent of the churches and schools in the duchy of Saxo-Gotha, and exercised the duties of his function with prudence, equity, and impartiality. He died at Gotha in 1645, and left behind him, as a memorial of his fame and learning, a work published in quarto in 1623, entitled "Philologia Sacra," which is pronounced by Mothem an ineffable and immortal work, in which none can be more useful for the interpretation of Scripture, as it throws much light upon the language and phrenology of the inspired writers, He was author, likewise, of "Onomatology Melfie Prophetica," "Chriftologia Mafaica et Davidica;" "Exegesis Evangeliorum et Epiphanorum," and some other pieces. Morei.
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 HEMOUR. 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 site occupied by it was originally called Ynyswytryn, or the Glas Islan, and in Latin Avalonia.
A town is said to have been built here, and largely endowed by king Ina about the year 708: in the next century 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 attached to the town was derived from its abbey; which, during six centuries, far surpassed in authority and revenues every other in England, excepting that of Westminster. The abbots enjoyed a state of regal splendour, with an income of nearly 40,000l. per annum, and held the title of lords, and sat at table with the peers in parliament. The abbey and its offices occupied an area of land of nearly sixty acres within the walls.
The last abbot, Richard Whiting, 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 Helston.
It being traditionally recorded, that this was the burial place of king Arthur, Henry II. ordered a search to be made, when a Ironen crofs was discovered with a Latin inscription 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 field rock, wherein were the bones of a human body, supposing 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 structure 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 abbots Whitting was executed,) standing on an eminence called 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. Benedict'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 justice, eight aldermen, and sixteen burgesses. The principal buildings are the two parish churches, two meeting-houses, two almshouses, and a free school. The George, a respectable inn, was anciently a hospital for the accommodation of pilgrims returning to the shrine of St. Joseph. In the centre of the town was formerly a large flone crofs, originally appropriated to shelter persons who attended the market. It was taken down about five years ago; but a plate and description are prefixed in the first volume of the Architectural Antiquities of Great Britain. Glastonbury is 130 miles distant from London, has a market on Tuesdays, and four annual fairs; the population returned, in 1801, was 410 houses, and 2033 inhabitants, of whom only 104 were employed in trade, which is chiefly that of manufacturing woollen stockings.
South-west of the town is Wearyall hill, so called from a tradition that St. Joseph and his companions, weary with their journey, halted here; and that St. Joseph struck 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 rock, still growing in the gardens of Glastonbury, and in various other parts of the kingdom. Collinson's Hill, Somersetshire, 3 vols. 4to. Maton's Western Counties, 2 vols. 8vo.
Glastonbury, a township of America, in the county of Bennington, and State of Vermont; having only 48 inhabitants.—Also, a handsome little town in Hartford county, Connecticut, situated on the E. side of Connecticut river, opposite to Westfield; containing 2718 inhabitants.
Glastonbury Thorns, in Botany. See Mespilus.
GLASTUM, from the German word glafl, an old name for Wood (see Isatis.) Hence several plants have the specific name of glasfolid, on account of the fineness of their leaves to that herb.

GLATT,
GLATT, in Geography, a river of Germany, which runs into the Neckar, 2 miles N. from Salz in Wurttemberg.

GLATZ, or Glätzen, a town of Germany, in the county of Frąger; 4 miles E. of Dornfetten.

GLATZ, a river of Switzerland, which runs into the Rhine; 2 miles below Eglfau.

GLATZEN, a mountain of Switzerland; 10 miles S.S.W. of Glarits.

GLATZ, a principality of Silesia, bordering on Bohemia, and surrounded by mountains. The internal territory is mountaneous, intersected with valleys, meadows, corn-fields, woodlands and small rivers. It produces wheat, generally sufficient for its inhabitants, and has pastures 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; and several mineral springs. From 1561 to 1742, Glatz was annexed to the crown of Bohemia; in 1742 it was ceded by the empress 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 seated on the Neisse, and built on the side of a mountain, having upon its summit a strong castle. The town contains about 450 houses within the walls, and as many in four faubourgs. 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, Kogel, a mountain of Austria; 12 miles S. of Steyr.

GLAVACIA, a town of Walachia; 35 miles W. of Bucharest.

GLAUBER, JOHN RODOLPH, in Biography, a celebrated chemist of Amsterdarm, 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 passed 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 seduced by his promises, contributed to bring the art of chemistry into contempt. His theory is full of obscurity; but his practice has perhaps been misinterpreted by those who listened to his vain and pompous pretensions; and who accuse him of a dishonourable traffick, in 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. Glauter 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 him the praise of acute men of mind, of facility and address in the prosecution of his experiments, and of extensive chemical knowledge. He was the inventor of a salt, which to this day retains his name in the shops of our apothecaries. The works of Glauter have appeared in different languages; the majority of editions are in German, some in Latin, and others in French. A collection of the whole of the Latin was published at Frankfort in 1628, in 8vo, and again 1659 in 4to. An English translation was published by Christopher Pack, London, 1689, in 8vo. Elyh. Dict. Hill.

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 Momet, Volta, Suckow, Gmelin, Bredfield, 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 neatly efflorescent; sometimes matted, seldom flat, flake-like or crystallized; in which latter case the crystals are described as acicular and as flat-foated prisms, more or less flatly acuminate by three planes, set on the lateral edges, or sometimes on the lateral planes: they are fibrous: their internal lustre is vitreous. Crude of the crystals small conchoidal. It varies from transparent to opaque according to its freshness. It is brittle. Its taste is a mixture of salt and bitter. Besides in the above forms, it occurs also, and most frequently, dissolved in certain mineral waters, in the neighbourhood of salt-mines and salt lakes, where also the efflorescence is mostly found on moist ground, and flat stone, and new walls. For the chemical character of this salt, see Soda, Sulphate of.

Bromnart has given the most complete list of the localities of Glauber salt. In solution it occurs in the waters of several lakes of Austria and Lower Hungary, especially in that of Neuhof, between the counties of Oedenburg and Worfelburg. It is met with in Switzerland; in Spain; round a source in the neighbourhood of Aranjuez, and near Vacha-Madrid, as efflorescence, at the bottom of a ravine: the source which issues from the mine contains a great proportion of this salt. Also the water of the Tagus is held to hold it in solution. In France it has been found near Grenoble. The deep fissures of the Sallatara of Fontaine yield this salt, in one place, on the north side. It is common in the lakes of Siberia; and it has been observed that the bottom of the lake Gumikof, between Tsjomil and Ilyasofy, is covered with a crust of Glauber salt as soon as the temperature is below the freezing point. Pallas tells us that the apothecaries of Orenburg annually collect a quantity of this salt, which is deposited in autumn at the bottom of a lake between the Tobol and Mius. It is also found in a lake near Courif; in another between Utoiska and Minkiakia, in the neighbourhood of Esuffey; likewise at the foot and in the middle of the chains of the Ural mountains, near Tchebikof; in the last of these places, the salt issues in the spring seet out of the earth in the form of efflorescence or froth. The chayey soil of that neighbourhood does not contain any Glauber salt; whence this is supposed to be formed, in the same manner as salt-petre is, at the surface of the earth, and by the action of the atmosphere. Lastly, this salt is also obtained from the alum-flate of Dittweiler, near Saarbrück, in the department of Sarre, and from the aluminiferous waters of Freyenwald, in Brandenburg.

Glauber's Salt, in Chemistry and Materia Medica. See Sulphate of Soda.

Glauber's Spirit of Marine Salt. See Muriatic Acid. Glauber's Spirit of Nitre. See Nitric Acid.

GLAUBERITE, a lately discovered mineral, belonging to the class of salts, and of which M. Bromnart 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-salt brought from Ocean in New Cadile, in crystals resembling those of thumus, or arsenite. They were chiefly on a count of their made of occurring) mistaken in Spain for pyrite.

The form of these secondary crystals, that of an ellipse very
very short proflinate with rhomboidal base. The planes of
the bafe are generally smooth and shining; the lateral planes
flattened parallel to the edges of the bafe. Cleavage double,
the one parallel to the bales, the other less distinct and par-
allel to the edges of the bafe; in all other directions the
fracture is vitreous. Hence the primitive form is an oblique
prism with rhomboidal base, the obtuse angles of which cor-
respond with the obtuse angles of the secondary prismatic. The
crystals are from topaze yellow to nearly colourless; they are
transparent, and, provided they are kept dry, preserve their
transparency and solidity though exposed to the air. Their
hardness surpasses that of sulphat, but is inferior to that of
carbonat of lime.

Exposed to an intense heat, the glauberite decrepitates and
melts into a white enamel. Immered 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, untouched and perfectly transparent. Specific
gravity about 2.73.

From M. Brongniart's experiments it appears that
glauberite is essentially composed of anhydrous sulphat-of
lime and of sulphat of soda, equally anhydrous. 2. That
these two salts exist in this substance nearly in the following
proportions:

| Anhydrous sulphat of lime | 0.49 |
| Anhydrous sulphat of soda  | 0.51 |

A trace of water, indicated by the calcination, is not
brought into account, as little as the accidental admixture
of a feebly perceptible quantity of iron, to which the yellow-
whitish colour of this substance appears to be owing.

Mr. B. adds the following observations: the above-menti-
oned pieces of salt from Oceana, which contain this sub-
stance, have generally some clay adhering, which penetrates
into the flies of the surfaces, but seldom into the substance
of the glauberite.

The efflorescence on glauberite, when moistened, and the
property this salt possesse of becoming opaque in water,
proceed from this, that the water, by dissolving the sulphat
of soda, transforms the sulphat of lime into a fupongy sub-
stance, and thus produces a phenomenon which is the reverse
of that exhibited by the hydraphane.

The existence of native sulphat of soda, or Glauber salt,
is well known to mineralogists, and, indeed, it has been met
with in the neighborhood of beds of rock-falt; but this
was only as solution in the water of salt-springs, or as efflo-
rescence near salt-mines: in a solid and crystallized flate,
entirely destitute of water of crystallization, and intimately
united with saltpetre, it had never before been observed. Even
the anhydrous sulphat of soda was almost entirely unknown,
until Berthier proved that it constitutes nearly the fifth part
of those hard scales found at the bottom of the pans in which
the sea-falt is obtained by evaporation.

It remains to be ascertained, under which circumstances
the rock-falt occurs which contains the glauberite, and particu-
larly in what relation this latter stands to it, and whether
it occurs in the sands or on the surface of the beds. See
Journal des Mines for 1808.

Hauty places the glauberite separately at the end of the
substances acidifera; and it appears to this mineralogist, that
the integrant molecules of the two salts of which it is com-
pounded exist together in the glauberite. He refers, for an
analogous combination, to Leblanc's experiments, according
to which a solution of sulphat of copper and sulphat 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 par-
cular crystallization. The question, therefore, is, whe-
ther the glauberite be in a similar case. Its form has, indeed,
nothing in common with that of the anhydrous sulphat of
lime; but we are totally unacquainted with the cry-
alline form of the anhydrous sulphat 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 differ-
ent form from either, this circumstance could, according to
Hauty's opinion, not be adduced as an objection against
the theory of crystallization, and must be considered as a pro-
blem, 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 Bartenhelm.

GLAUCEDO, in Surgery. See GLAUCOMA.

GLAUCHA, in Geography, a town of Saxony, in
the lordship of Schomburg, on the Mulda, containing about
600 houses; the inhabitants are employed in the manufac-
ture of fluffs; 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 Halle, but governed
by its own magistrates; in which are four fermaries, where
the languages, theology, mathematics, music, &c. are taught
by 120 preceptors.

GLAUCION, in Ornithology, a species of Antha, the
grey-headed duck. See DUCK.

GLAUCIUM, in Botany, is so named from its glaucous,
or sea-green, colour. Whether the plant intended by Pliny
be the Yellow Horned Poppy, according to the opinion gen-
erally received, or any maritime species of Eschscholtzia,
seems a point not easily determined. GLAUCION of Dioscorides
appears to be the juice of the first-mentioned in its wild state,
though he compares it to his ΑΙΙΑΛΟΧΟΝ, (which is evidently
the Yellow Horned Poppy itself,) saying the plant which yields
the φαλαχανή, and grows at Jerusalem, has almost the leaves
of the ΑΙΙΑΛΟΧΟΝ, but thicker, and spread on the ground,
strong smelling, and more bitter, yielding plenty of yellow
coloured juice. Possibly this may refer to one of our other
species of Glaucium, 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 presume, previous to the disco-
ey of America, though now naturalized in the East Indies;
see Eschscholzia. 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
Gamboge for φαλαχανή, but this does not at all help us, as to
the botanical question, nor has it any probability in its
Mill. Dict. v. 2.)—Clas and order, Polyandra Monogynia.

Gen. Ch. rul. Parthen inferior, of two ovate, conca
tent, blunthilt, deciduous leaves, often tipped with a point near the
summit. Cor. Petals four, large, roundil, slightly concave,
nearly equal, with a thinning spot near the base. Stam.
Plaments numerous, shorter than the corolla, flat, incurved,
rather dilated upwards; anthers erect, roundish, of two
lobes. Pist. German nearly cylindrical, curved, longer than the
the flamen; style none; stigma with two or three lobes, downy. Peric. Pod linear, curved, very long, of two or three cells, and as many concave valves. Seeds numerous, globular, dotted. Receptacle linear, fimbriate, parallel to the valves, its surface cellular to receive the seeds.

Eff Ch. Calyx of two leaves. Petals four. Pod superior, linear, of two or three cells and two or three valves. Seeds numerous, dotted.

Obf. 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 crested to its cells.


2. G. fulvum. Orange Horned-Poppy. Scmp. Exot. Bot. v. 1. 11. 1. 7. (G. glabrum, flore phoeniceo; Tourn. Imit. 254. Chelidonium cornutum; Donn. Cant. ed. 5. 131.)—Stem smooth. Stem-leaves rounded, waved. Pods rough. Flowers nearly sessile. 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 sessile, 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 first 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, propagates itself by seed and remains unaltered. Its flowers, contrasted with the 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.

3. G. rubrum. Red Horned-Poppy. Scmp. Prodr. Fl. Grac. v. 1. 357. (G. orientale, flore magni rubro; Tourn. Cor. 18.)—Stem hairy. Stem-leaves pinnatifid, cut. Pod strongly hairy. Gathered by Dr. Sibborth by the way-side between Smyrna and Barfa, as well as in the isle 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 it essentially differs from both the preceding, as it does from the following in the soft hairs, instead of rigid bristles, which clothe the pods and its stem. The flowers are stalked, with obvate petals, narrower and flatter than in either of the former, of a tawny red, with a violet spot on the claw. Lööv's Papaver cornutum phoeniceum alterum, t. c. 271, f. 2, 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 Corolla as different from all he had previously enumerated, including Lööv's plant.

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4. G. phoeniceum. Scarlet Horned-Poppy. Scmp. Fl. Brit. t. 9/94. Prodr. Fl. Grac. v. 1. 357. Engl. Bot. t. 145. (G. lutea, flore phoeniceo; Tourn. Imit. 254. Chelidonium; Curt. Land. fait. G. t. 32. Chelidonium phoeniceum; Linn. Sp. Pl. 724. Papaver cornutum, phoeniceum; Lob. Ic. 271. 1.)—Found in cultivated fields in the south of Europe; a do jelly native of England, though easily naturalized in a garden. It is a tall, flowering in summer and autumn, and grows rather more erect and bushy than the last, from which it differs in the rigid close-preffed bristles which clothe the pods. The pods moreover are larger, rounder, and of a rich tawny, though each marked with a violet spot like the last; and the remaining bristles on the flabellum are very different from the flat hairs of that species.


GLAUCIUM, in Ornithology, a name given by Brilison to the Anna Caudex of tufted duck. See Deck; and also to the Anna Marilis, or scmp-duck. See Deck.

GLAUCOMA, or Glaucoma, a term, in Surgery, imparting, according to Mr. Samuel Sharp, what the Latin writers understood by sufflatum, and what we call a cataract. This defect, as we have often when explained, is an opacity of the crystalline lens. (See CATARACT.) Maitre-Jean, St. Yves, and other oculists, however, think, that glaucoma is a cataract complicated with the want of a sero, or an insensible film of the retina and optic nerve. (See GlaTTA SCLERA.) The word is derived from glaucos, blus, the pupil frequently having this colour. Some writers have regarded glaucoma as a defect of light, originating from an opaque, scattered turbid flat of the vitreous humour. Such a case is uncommon; but were an opacity of this kind to impede vision, an endeavor should be made to diffuse it with small doses of calomel, and by exposing the eye to the vapour of ether. In the event of these means failing, the opacity might be broken and disturbed with a coughing-meedic. The fuses hematodes of the eye must be determined. See Fuses.

GLAUCOPIS, in Ornithology, a genus of the order Pic. The bill is incurved and arched; the lower mandible shorter, and carunculate beneath at the base; the nostrils depressed, and half-covered by a fleshy cartilaginous membrane; tongue flesh-cartilaginous, divided at the end, and ciliated; legs formed for walking; toes three before and one behind.

The only species of this extraordinary genus at present known, is the wattle-bird of Dr. Fed., described by the Voyages of Captain Cook, and which appears to be a posterior. Observed in some naturalists, in the Australian regions. It is from the length of the leg, the length from the bill to the tail, and the length of the tail. The bill remarkably strong, and a little square at the back. The nostrils are situated in a hollow at the base of the bill, and are half-covered by a fleshy cartilaginous membrane which falls over as a cover to the ramus.
are pendent from the base of the lower mandible on each side, and the texture resemble the wattle of the common cock; the colour at first blue, and afterwards fine orange. The iris is fine 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 red.

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. Ptolemy.

GLAUCUS, a river of the Peloponnesus, in Achaea, near Patras. Pauchanius—Alfo, a river of Asia Minor, in Lycaea, having its mouth N. E. of the town of Tymithis, in the gulf of Glauces.—Alfo, a river of Asia, in the territory of Cocius, where it discharges itself into the Phasis. Pliny.—Alfo, a gulf of Asia Minor, in a direction from N.W. to S.W. More anciently this gulf was denominated the gulf of Tymithis, from the name of the town, situated near its termination in the eastern part of it.

GLAUCUS, in Ichthyology, a species of Chidodon; which see.—Alfo, a species of Smolner. —Alfo, a species of Falks, which see respectively.


Gen. Ch. Cal. none; unless the corolla be considered as such. Cor. of one petal, five-cleft, bell-shaped, crept, permanent, with obtuse revolute lobes. Stem. Filaments five, awl-shaped, crept, the length of the corolla; anthers roundish. 2. Pfl. German ovate; style filiform, as long as the stamens; stigma capitata. Peric. Capsule globose, pointed, of one cell, with five valves. Seeds five; roundish; receptacle very large, globose, hollowed for the seeds.

Ell Ch. Calyx of one leaf. Corolla none. Capsule of one cell, with five valves and five seeds.

1. G. muririma. Black Salt-wort. Linn. Sp. Pl. 501. 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, leathery, and felt-coloured, pubescent, 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 Prodromus Florae Graecae, because Dr. Sibthorp did not himself observe it in his journey.

GLAZIC, in Geography, a small island in the English Channel, near the coast of France. N. lat. 47 26. W. long. 2 56.

GLAZIER, an artificer or dealer in glass.

GLAZING. 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 cornal-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 seems 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 guessed 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 lost its beauty; and afterwards, that it was a custom to cover over whole statues with this fort of glazing, which he observes did not only make a smooth coat, but sunk into the matter of the foam or earth, and therefore this could not be likely to crack and fly off like our lead-coats on plates, &c. which is merely a crust laid over them. Hook's Philof. 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 Diamontiam.

A transparent glazing may be prepared, without lead, by calcining 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 wood-ashes 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 Kunckel, who says that they are the true glazings used at Delft, and other Dutch manufactories.

GLAZING. Black, is made of eight parts of red-lead, iron filings three, copper-ashes three, and zaffre two measure.

This, when melted, will make a brown black; and if you want it blacker, add more zaffre to it.

GLAZING. 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 glas half a pound, zaffre half a pound, mix them well together, and melt them 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 glass furnace for a day or two.

Another blue glazing may be formed of one pound of tartar, a quart of a pound of red-lead, half an ounce of zaffre, and a quart 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 zaffre, tartar, and Venetian glas, each one pound. Calcine and fuse the mixture as before.

Or, again, take of red-lead one part, of sand three parts, and of zaffre one part. For a violet blue glazing, take four
GLAZING.

ounces of tartar, two ounces of red-lead, five ounces of powdered flints, and half a dram of manganese.

GLAZING, \textit{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, \\textit{Gold-coloured}, is made of twelve parts of lead-ashes, and one of white glafs.

GLAZING, \textit{Gold-coloured}, to make gold-coloured glazing, take of litharge 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 fiffble powder, which moisten with a well faturated 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, fo that by means of an 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 glasing, must be first well heated, then put under a muffle; and as soon as the glafs runs, you must foonk them, by holding them over burning vegetables, and take out the vessels.

Mr. Heinfius of Petersburg, who sent this receipt to the Royal Society, ufe the words \\textit{affigere deos suum}, which is rendered \textit{imanab them}, in the Transactions, Phil. Trans. No. 465, \textit{p. 6}.

Kunckel 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 fparifh 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 fcales 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 glafs. 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, \textit{Green}, may be prepared of eight parts of litharge, or red-lead, eight parts of Venice glafs, four parts of brafs-duft, or filings of copper; or, of ten parts of litharge, twelve of flints or pebble, and one of \textit{azylum}, or copper-ales.

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 glafs; or by fusing one part of white glafs, the fame quantity of red-lead, and alfo 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, \textit{Iron-coloured}, is prepared of fifteen parts of lead-ashes, or red-lead, fourteen of white fand, or flints, and five of calcined copper. This mixture is to be calcined and fufed.

GLAZING, \textit{Liver-coloured}, is prepared of twelve parts of litharge, eight of fand, fix of pebble or flint, and one of manganese.

GLAZING, \textit{Purple-brown}, conifts of lead-ashes fifteen parts, clear-fand, or powdered flints, eighteen parts, manganese one part, and white glafs fifteen measures; to which fond add one measure of yellow.

GLAZING, \textit{Red}, is made of antimony three pounds, litharge, or red-lead, three, and ftrut of iron; grind them to a fine powder. Or take two pounds of antimony, three of red-lead, and one of calcined faffron of Mars, and proceed as before.

GLAZING, \textit{Sea green}, is made of five pounds of lead-ashes, one pound of tin-ashes, three pounds of flint, three quarters of a pound of fand, half a pound of tartar, and half a pound of copper duft.

GLAZING, \textit{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 fand, or broken white glafs, one part, and fand one 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 fand, twenty-five pounds of litharge, or lead-ashes, twenty-six of pot-ashes, and ten pounds of fand: 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 clean fand, twenty of lead-ashes, thirty of wood-ashes, and twelve of fand.

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, and of flints and commom fand, of each one part, and fufing the mixture. See \textit{Delf-ciw}.

A white glazing may be prepared by mixing one hundred pounds of mallicot, fifty pounds of red-lead, twenty pounds of calcined tin or putty, and ten pounds of common fand; and calcining and powdering the mixture several times.

GLAZING, \textit{Tellow}, is prepared of red-lead, three pounds; calcined antimony and tin, of each two pounds: or, according to fome, 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-one, three parts of litharge of silver, and fifteen parts of fand.

A fine yellow glazing may be procured by mixing five parts of red-lead, two parts of powdered brick, one part of lead, one part of the white glazings, and two parts of antimony, calcining the mixture, and then fufing it. Or, take four parts of white glafs, one part of antimony, three parts of red-lead and one part of iron feals, and fufe the mixture: or, fuse fourteen parts of flints, one part of iron-filings, and twenty-four parts of litharge. A light yellow glazing may be produced with ten parts of red-lead, three parts of antimony, and three of glafs, and two parts of calcined tin. See \textit{Gold-coloured Glazing}.

GLAZING, \textit{Citrone-yellow}, is made of fix 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 afi-hole of a glafs-boule furnace, and at laft urged to fufion.

GLAZING of \textit{Delf-ware}. See \textit{Delf-ciw}.

GLAZING of \textit{Porcelain}. See \textit{Porcelain}.

GLAZING of \textit{Stone-ciw} and Queen's ware. See \textit{Porcelain}.

GLAZING for Tobacco Pipes. See \textit{Tobacco-pipes}.

GLAZING, in \textit{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 fixed body of opaquethe;
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 suspension the two colours thus employed. In this mode their hues are blended, without disfigurement of each other; whereas, in mixing them in the ordinary way, a certain diminution of their brilliancy takes place, produced by the dissimilar nature of their qualities.

Glazing appears to have been practiced 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 practiced 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 Substances, 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 tinted, 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 fleh, 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 luire. It is quite impossible to make any effect exactly like it with fresh colours, unless force and care be used to furrow 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 unskilled amateur, to the enrichment 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 have 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 a general manner. A well-informed and scientific artist knows the tone which one colour glazed over another will produce; and without that knowledge, a dirty dunhef may be the effect, instead of the cleanliness required; and if not successful, it is always injurious; there is no medium in the application of it. If the under colour is not improved, it is sure to be deteriorated; 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 cleanliness 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 state 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 yellow, will change it to the end he may require; and if he use the blue and yellow together as a green, it will produce a negative colour; totally destroying the red; but the varieties are too complicated and numerous to follow.

GLAZING of Cloth. 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 glofs 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 one 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-howl 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 assignees 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 this process.

The patent glazing machine, like the common calender, consists of five bowls, or cylinders, four of which are of cast
GLA

call iron, smoothly turned, and finely polished on the surface, and the large or intermediate cylinder is generally of plate
board 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 respec-
tive diameters, so that an equal quantity of superficies is con-
stantly exposed of each. In the calendering-mill, or machine,
it is only necessary that the motions of one of the cylinders
should be so much accelerated as to produce the friction
corresponding to the glazing by rubbing against the other
cylinders with which it is in contact, so as not to be liable to
wear or otherwise injure the fabric. This motion is pro-
bred by means of wheels placed in the following manner:
On the axis of the main cylinder, A, is a call iron 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 regula-
ted so as to pitch well into the remaining wheels. The
wheel is placed to revolve loosely on an iron fluid, screwed
into the frame-work 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 is removed by being taken off the fluid, the
whole cylinders will revolve exactly as in the common ma-
chines, without producing any glazing effect. The simpi-
city of this machine, the regularity of the gloss which it
gives, and the immense saving of labour, are powerful
recommendations in its favour. The great quantity alo which
may be effected by it in a very limited time, renders it pe-
larly adapted to meet the occasional exigencies of the
experimenter; and the additional advantage of its facility of adapta-
tion to the purposes of the common calender, when glazing is
not required, adds to its value and utility. Upon uniform
occasions, one of these engines, by being constantly em-ployed
even by day and night, will glaze from 600 to 800 pieces of cloth,
in 28 yards each, weekly.

Those employed in the late Mr. Miller's works are driven
by means of a steam engine, by which various other kinds
of machinery, adapted to the various operations of the bus-
iness, are set in motion. Should any machinery of this de-
scription be contracted in works where there may be a gen-
eral 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
horse, should be ample; as it must be evident, even to those
who are not practically conversant with the calculation of
power and resistance, 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
ascertaim, with any tolerable precision, the quantum of re-
stistance added by the friction; nor are we aware that any ac-
curate experiments have been made for that purpose. But it
is evident that it must be very great in all calenders. It is reas-
able also to infer, that it may be considerably increased or
diminished by the texture or fabric of the flint upon which the
glazing operation is performed. Hence, if these machines
are employed incessantly in large works, and let 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 calender-
ingen, a deficiency would be found, which must render it ne-
cessary to disengage 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 obvious errors
into which the projectors of large works, who are not mechan-
ics, are apt to fall. In the first instance, detours that a
large establishment should be to fire at the ball possible
expense, they too frequently calculate too barely, and are
then obliged either to abandon their whole scheme at a great
loss, to work it under serious and ruinous inconvenience, 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 Viatka, on the Tchetsva; 56 miles E.S.E. of
Viatka. N. lat. 58° 5'. E. long. 51°.

GLEAG, or GLAIL, in Ornithology, a name used in the
northern parts of the kingdom for the milke, or kite. See
FALCONS.

GLEAM is popularly used for a ray or beam of light.
Among falconers, a hawk is said to glean, when the cats
or thrown up filth from the gore.

GLEAM, in Geography, a river of England, which rises
about four or five miles N. of Stanfordin Lincolnshire, and
ranst into the estuary called the Wash, five miles N.E. of
Spalding.

GLEAMING, the act of gathering or picking up the
eras of corn left behind, after the field has been reaped, and
the crop carried home.

By the customs of some countries, particularly those of Me-
lun and Ebalpes, all farmers and others are forbidden, either
by themselves or servitors, 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 com-
mon law and custom of England the poor are allowed to en-
ter and glean upon another's ground after the harvest, without
ch. 15. 438. This humane provision seems 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 prevailed greatly in
some of the southern districts. The custom is of great anti-
quity; and whether it is 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 sanctioned by its con-
venience, that it is but rarely interrupted or put a stop to by
him. In some places where it is carried on to excess, it would
then become 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 sheaves, and too often from them," as is notorious
to those who have attended to the practice. It has been
therefore suggested to make it a rule not to hinder a gleaner to en-
ter a wheat field until it is wholly cleared of the crop, which
would, no doubt, prove a very beneficial regulation. It
does not, however, upon the whole, appear that much bene-
fit is derived to the poor from the custom, while it con-
dently leads to idleness, immorality, pilfering, and a number
of disadvantages.

GLEBA ALANA, a name by which some call the yel-
lowish white tripoli.

GLEBE, Addit. In the civil law, fases were held to be
annexed to the glebe; i.e. they went with it; were held with
it, &c.

The right of patronage should be annexed to a glebe.

GLEBE,
GLEBE, GLEBA, in *Natural History, Chemistry, &c.* a clod, or piece of flone or earth, frequently containing some metal, or mineral.

The glebe is carried to the forges to be wrought, purified, and melted, &c.

GLEBE, or *Glebe-land,* is properly used for church-land;

"Dos vel terra ad ecclefsiam pertinent."GLEBE-land is most commonly used for land belonging to a parish-church, beside the tithes.

Thus, Lindwood: "Glebe et terra in qua consitit dos eccleſiae; generaliſter tamen finitur pro folo, 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, fee, manor, inheritance, or the like.

If any parson, vicar, &c., hath caufed any of his glebe lands to be manured and fowed at his own cofls, with any corn or grain, the incumbents may devise all the profits and corn growing upon the faid glebe by will. (Stat. 28 H. 8. cap. 11.) And if a parson fows his glebe and dies, the executors shall have the corn fowed by the teftator. But if a glebe be in the hands of a tenant, and the parson dies after feverance of the corn, and before his rent due; it is faid, neither the parfon's executors nor his fucceffor can claim the rent, but the tenant may retain it and alfo the crop, unless there be a fpecial covenant for the payment to the parfon's executors proportionably, &c. Wood's *Infl. 163.*

GLEBE, in Geography, a town of America, in the flate of Virginia; 10 miles S.E. of Tappanville.

GLEBOUS, in Rural Economy, a term sometimes provincially signifying the turf or gravity surface.

GLEBOW, in Geography, a town of the duchy of Courland; 18 miles S. of Miottaw.


Gen. Ch. Car. Persianth of one leaf, tubular, cylindrical, frilled, very small, permanent; its mouth having five sharp unequal teeth. Cor. of one petal, ringent; tube flender, compressed; upper lip erct, oblong, lower lip spreading, larger than the upper one, obtuse, 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 crofs. *Pijf.* Germen four-cleft, style thread-shaped, bending under the upper lip; stigma cleft, acute. *Peric.* none; the calyx nonrigidly four, ovate in its bizon.


1. *G. hederacea.* Ground-ivy. Linn. Sp. Pl. 827. Engl. Bot. t. 823.—"Leaves kidney-shaped, crenate."—Found in woods and hedges, flowering in April and May. Root perennial, and creeping. Leaves on foot-flats, dotted beneath with glandular points. *Flowres* axillary, about three to each leaf, prettily speckled with white and blue. *Calyx* dilated. *Anther* white. Ground-ivy has been so long and so generally known, that it has obtained various appellations, such as *Ale-hoof,* Gill, Robin-run-in-the-hedge, Cat's-foot, &c. Before the introduction of *Hops* its leaves feem to have been used for flavouring and clarifying ale. Gerarde has enumerated a long train of "Vertue" 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 faid to injure horses if taken too copiously. The specific character is now superfluous, as two species enumerated in the first edition of the *Species Plantarum* are now referred to other genera.

GLECOMA *Hederaecea, ground-ivy or gill,* 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, being bent beneath with hollow dots, in which are glands secreting an effential 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 tafe is bitter, and somewhat aromatic. This plant was formerly supposed to posses great medicinal powers, not discovered by former 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, vulnerary, corrodorant, eruline, &c. and it has been recommended for the cure of those disfresses to which these powers seem to be most adapted, but chiefly in pulmonary and nephritic complaints. In obstinate coughs it is a favourite remedy with the poor, who, probably deriving benefit from it, perfitin its ufe. Ray, Mead, and others, speak of its being usefully joined with fermenting ale; but Dr. Cullen obferves, "it appears to me frivolous. In fhort, in many cafes where I have feen it employed, I have had no evidence either of its diuretic or of its perifical effects. In common with many others of the verticillate, it may be employed as an eruline, 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.

GLEANONITAS, a name given by the ancient *Phvfcus,* to a fort of wine impregnated with penny-royal, much recommended in all obftructions. It takes its name from *gleos,* the Greek name of penny-royal, or *pulegium.*


Female, on a separate plant, Car. Persiathan like the male, but of five leaves. Car. Petals five, long, acute, rather spreading. Nectaries two, short, like abortive filaments. *Pijf.* Germen superior, broad, compacted, longer than the corolla; style short, reflexed; stigma thick, the length of the style, to which it is longitudinally affixed, downy in the upper part. *Peric.* Legume very large, broad, compreded quite flat, divided by numerous tranverse partitions, and filled with pulp. Seeds solitary, roundifh, hard, and polished.

At the summit, generally, of the male spike is an united flower, with four calyx-leaves and as many petals, with a nectary and flammes like the male, but with a pillif, producing perfect fruit, as in the female. Hence Linnaeus referred this genus to his clas *Pulegium,* but if it remains there
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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 *Diosca.* See Sm. Introd. to Botany, 478, 485.

Obf. This genus has considerable affinity with *Ceraonia,* especially in the fruit. We cannot apply the term actinomy to its inoffensiveness, which is a spike.


Female, Calyx of five leaves. Petals five. Nectaries two. Pilif one. Legume.

Some flowers united, four-cleft.

The species of *Gladiola* are as yet a mass of confusion. *G. trianum.* Linn. Sp. Pl. 1509, the original one, a native of North America, was cultivated by bishop Compton in 1506, and is a tall handline tree, which bears our climate well, except being sometimes broken, like *Rheum* *Pilea* *sativa,* by strong winds. It is remarkable for its large frond or compound spines, which grow to the length of six or eight inches, from a very slender base. The leaves are deciduous, bipinnate, large, consisting of innumerable elliptical, slightly toothed, nearly smooth leaflets, half an inch or nearly an inch long. Flowers greenish, in axillary spikes. Some leaves appear to be finely 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. cambria,* which Linnæus also had at Upsal, but he does not seem to have described it. The spires are compound. Leaves finely and abruptly pinnate, of seven or eight pair of thin, squarish, unequal-sided, crenate leaflets, gradually larger upwards, the terminal pair being sometimes twice the dimensions of the next.

In Summer's garden, belonging to the duke of Northumberland, is a tree of another species, of which we find no mention. Its leaves are finely pinnate like the leaf, and the leaflets also gradually larger upwards, but they are coriaceous, elliptical, their sides very seldom unequal. The calyx-leaves and petals are narrower, shorter, and blunter than in *G. trianum.* Of its spires we have no account, but the leaves and flowers were communicated to us by Mr. Mayo, in August 1796, as a *Gladiola* not in the *Hortus Kewensis,* where, indeed, all that are known are made varieties of the *trianum.* From the new edition of this valuable work perhaps more information may be expected.

*G. inermis,* first mentioned by Linnæus in the second edition of Sp. Pl. 1509, seems to have been adopted without a specimen, from Plukenet's t. 123 f. 2, to which is added Miller's t. 5, which last 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 letter is a defibrable object, and worthy the attention of those who have perpetual access to the old botanical 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 spires vary according to the age of the tree; and whether the legume is, in any species, constantly single-fed, or merely from accidental 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 *Gladiola* claim a distinguished place. The labours of a Lambert among the Pines, and a Michael 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. tricantus*), 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 fowling the seeds, which are obtained fresh from America, in a bed of light earth, in the early spring season, watering them occasionally when the season is dry. It is, however, a much more expeditious practice to sow 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 into nursery rows, at a foot or eighteen inches distant from each other, and eight or ten inches in the rows. Such small plants as remain, may be put out in the same manner in the next autumn or spring.

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 best in situations where the soil is of the more light deep kinds, and rather inclined from the inclement 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.

*G. Lee,* a musical term derived from Skinner, Junius, John-son, and all the etymologists, from *glie,* Saxon, joy, mirth, sport.

His merry men commanded he
To make him both game and glee.

Chaucer, Rin. S. Tap. v. 126.

The term, we believe, is not to be found in music-books, or musical writers, before the middle of the 17th century. The first time it appears in the title of a collection of canons, rounds, and catches, is in a publication by John Playford, 1657, under the title of "Dialogue, Glis, Ayres, and Ballads, of two, three, and four Voyces."

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, singling the same words." When subjects of fatigue or imitation occur, and the composition is more artificial than simple counterpoint, it leads resembles a glee than a madrigal, which it might, with more propriety, be called, if the words are serious; for a serious glee forms a complection, 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, *muse* itself.

*Glee,* in *Surgery,* commonly signifies the continuance 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 strictures, diseased prostate gland, &c. is also frequently called a gleet. A mere gleet, unattended with any other difcase of the parts, is not accompanied with the remarkable

pain.
G LEET.

pain and discharging inflamnation in making water, which are produced by gonorrhoea. 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 gonorrhoea, likewise, in not being infectious. It is well known that it was one of the doctrines of this eminent surgeon, that the poison of gonorrhoea, 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 gonorrhoea in not being infectious, that a gleet is not capable of communicating the general disease, no one can question the accuracy of the observation. But, on the contrary, if the affection implies that the matter of a gleet, when applied to the pudenda, will not bring on a pain in making water, a discharge, &c., then we differ from the opinion altogether. We have known an influence, in which a gentleman, who had had a gleet upon him for upwards of a year, and who, on the presumption that it was not infectious, ventured to have connection with a young woman, of whose continence, with regard to other men, we ourselves entertain no doubt. However, there may be gleets of various kinds, and none of them may be infectious, and others not so. When, after a gonorrhoea, a thin discharge continues for a long while, to take place from the urethra, the complaint may depend upon a weakness of the viscid, or, as Mr. Hunter expresses it, upon a habit of action, which the parts have contracted. When a gleet arises from a fluxure in the passage, or from a disease of the prostate gland, the cause must be referred to irritation, and the cure depends on the removal of the original complaint.

Gleets, which are the consequences of gonorrhoea, are often exceedingly difficult of cure, and what is very curious, it frequently happens, that, after they have received every sort 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 disappearance under particular modes of treatment; but, as soon as this is remitted, regularly return again. A vast number of gleets depend upon the presence of a fluxure in the urethra, and of these are not curable by injections. We have often thought that in all cases of gleets, it should be the invariable custom of the surgeon to introduce a bougie, for the purpose of ascertaining whether there is any obstruction in the passage; for, when the discharge depends on a fluxure, the patient might make use of balms, turpentine, and bougies, for years, and yet receive no benefit whatever. At all events, whenever a gleet yields ordinary means, the state of the urethra and of the prostate gland ought to be examined. See Prostate Gland, Disease of; and Stricture.

Mr. Hunter was of opinion, that the spontaneous disappearance of a gleet, after a long resistance 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 rheumatism. This idea is founded on the circumstance, that more gleets may be cured by sea bathing, 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 faith 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 febrifugal complaints, such surgeon, as reason on Mr. Hunter's principles, will immediately set down the case as febrifugal. It is never remembered in this calculation, that mercury cures many diseases besides the venereal; and to do sea bathing many complaints besides those which are of a febrifugal 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 contradiction 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 most skilful surgery, and the patient, tired of the incessant trial of different remedies, relinquishes the trial of all. In slight cases, and occasionally in invertebrate ones, a cure may be effected by exhibiting internally the balsam of copaiva, the oleum terebinthii, or the tincture of bylze (catharines). It is well worthy of notice, that when a cure can be accomplished by these means, benefit is often derived from their employment. For this reason, when they neither disappoint, 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 stopped 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, barks and fleshy 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 many ways 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 flux, 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., astringent and irritating ones. The astringent ones are, for the most part, such as the decoction of barks, and solutions of zincum vitriolatum, chlor, or nitric of lead. An injection of proper strength, containing cuprum vitriolatum, balsum gallicum, and camphor, is also an exceedingly eligible one.

The bell irritating injection which we know of, is that made by dissolving two grains of the hydrargyrum muriatus 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 worn for the cure of gleets. In general, common bougies are employed; but sometimes others, medicated with camphor or turpentine, are used.

In irritable constitutions, the latter kind of injection and the bougies may exercise a good deal of irritation, pain, fluxure, &c. so that some circumspection is necessary in the employment of such means. We may state, indeed, that no endeavour should ever be made to cure a gleet, by exciting irritation in the urethra with stimulants injections, or bougies, before mildest means have failed. We have found a weak
weak injection of the hydrargyreum muriatus more frequently successful than any other. One grain to fix 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 profiting in 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 cafes, but there are instances in which gleet seem to be benefited and cured by rough exercise on horseback.

A return or an increa 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 cafee might be discriminated by the short time which intervenes between the connection and the reappearance of the discharge. Gleet are often too exceedingly obilinate, 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 flop on the breaking out of two chances on the glands penis, and the discharge has been known to stop as soon as a blisters was applied to the under part of the penis.

Gleet have likewise been cured by electricity.

Women are liable to gleet, and the disease being situated in less irritating parts, whatever injections are used, may be made stronger than for male patients.

It is almost unnecessary to remark, that halfmen and turnitines, 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.

GLEBERG, or GLITZBERG, in Geography, a town of Germany, in the principality of Nassau Weilburg; eight miles N.E. of Wetzlar.

GLEICHEN, a county of Germany, in the principality of Gotlia, divided between the princes of Gotlia, Hohenlohe, Hatzfeld, and Schwartzburg; situated on the banks of the Ohr, between Erfurt and Gotlia.

GLEICHEN, Frederick 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 Bavenoth, 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 honour did not sit easy upon him, for he retired, and in 1756 his wishes were accomplished; he obtained a commission from the service with a handsom 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 microscopical observations, and not satisfied with the instruments already in vogue, he constructed an universal microscope, with which he combined the polar microscope. His principal observations relate to seminal animalcula, and infuion animal: he would fit day after day at his glass, and was always displeased if he experienced any interruption while engaged in his favourite pursuit. By daily practice he had acquired a vivid recollection of minute 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 devised various economical plans, from which he expected to derive great emolument, but they were the schemes of a dreamer, 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 Fruittification in Plants when in bloom, and on the Insects found in them;" "History of the Common House Fly;" "Treatise on seminal Animalcula and infuion Animalcula;" "A Essay towards the History of the Tree-louse from the Elm;" this insect, the aphus ulmi campeli, call our author the labour of eight years; it is the caule of the bladders on the leaves of the elm-tree during the spring. Gen. Biol.

GLEICHENBERG, in Geography, a town of the duchy of Stirm; 10 miles N. of Ruckhill.

GLEICHENBERGAN, or GLEICHENBERG, a town of Germany, in the county of Henneberg; four miles N. of Ronnhild.

GLEICHENIA, in Botany, named by the writer of this article in honour of Philip Frederick Baron von Gleichen, author of a splendid microscopical work on the structure and physiology of the parts of fruitification 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 Gleichen paid great attention, a genus belonging to this curious tribe was judged peculiarly proper to commemorate him. Smith in Mem. de l'Aced. de Turin, v. 5. 419. t. 9. f. 10. Tracts. 258. t. f. 16. Swartz. Fil. 165. Brown. Prod. v. 1. 160. (Mertensia; Wilden. in Àet. Holm. ann. 1821. 165. t. 45. f. 5. Swartz. Fil. 165.)—Cliff and order, Cryptogamia Filiæ; sect. Annulata. Nat. Ord. Filiæ dorsiæ.

Eff Ch. Capsules in a simple, concentric, orbicular feries; each feries constituting a round separato dot, on the back of the leaf. Cover none.

This genus was first founded on the Onclea palposdica of Linnaeus, an elegant and singualr fern, native of the Cape of Good Hope. In this the capules are usually three, rarely four together, half immerse in the under side of the frond, and as each berries 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 jointed ring appear upon some of the valves only, and rather resemble the corrugations of those ferns termed *paciens* inundates. Several other species, strictly 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 described by Dr. Swartz and Mr. Brown. In these the capules are not immerse in the leaf, though each feries stands in a light depression. In Gleichia of Brown there are only two together; in others three, four, or even six. These new discovered species evince the propriety of Mr. Brown's measure, of reducing the *Mertensia* of Willd. into Swartz to Gleichia, as their frettations exactly agree. *Diacoptera* of Bernhardi does not in our opinion as well afford us, having an irregular accumulation of flaked capules 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, frillated, transverse, rarely oblique, ring.
This genus naturally divides itself into two sections. The original Gladiolus, of which there are five species, have the ultimate branches of their repeatedly forked stem pinnate, their leaflets or pinnae deeply pinnatifid, with short, triangular, or rounded segments, each segment bearing a single dot or series of capsules. The Meriania 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 Lichfield; seven miles S.E. of Heiligenlindt.

GLEINSTOLLEN, a town of the duchy of Sturia; 14 miles S. E. of Voitberg.

GLEISS, a town of Switzerland, in the Valais; 26 miles E. of Sion.

GLEIWITZ, or Gliwice, a town of Silesia, in the principality of Oppeln; 20 miles N. E. of Ratibor. N. lat. 53° 17'. E. long. 18° 35'.

GLEN RIVER, a river of Lincolnshire, which rises near Reepley, and pursues a course nearly S. S. E. to Brackn-le-Knowle, then, suddenly turning N. N. E., it plunges to Gates bridge and through the Tens, by Surfleet, to the sea at Foddyke Water; for the greater part of its course through the Tens 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 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 post-town of the county of Antrim, Ireland, on the coast of it, adjoining which is Glenarm castle, the seat of the counts of Antrim. The town is pleasantly situated on the seashore, near the bay of the same name. It is 104 miles N. from Dublin, and 24 N. from Belfast.

GLENAVY, a post-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 Argyll, near Loch Leven, where, in the year 1691, the inhabitants were massacred contrary to the faith of a royal proclamation; 17 miles N. of Inverary.

GLENDALOUGH, Gleandelough, or Glendellach, commonly called the Seven Churches, an interesting 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 glein, a valley, and lac, 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, Episcopus Bilaganecus, the bishopric of the two lakes. Glendalough is surrounded on all sides, except to the east, by stupendous mountains, whose vast perpendicular height throws a gloom on the vale below, well suited to inspire religious dread. From these, many mountain-streams fall into the valley, and, forming a junction, assume the name of Avonmore. One of these streams, called St. Kevin's keeve, is still an object of superstitition; weak and sickly children being dipped in it every Sunday and Thursday before sun-rise, and on the third of June, which is St. Kevin's day. The two lakes in the vale are divided from each other by a rich meadow; the rent of the soil is so rocky as to be incapable of tillage by the plough. The names of the adjoining mountains, in which the word Derry often occurs, are supposed to denote that they were formerly covered with wood; at present they have only brown heath, or more fertile peat. Between the cathedral and upper lake is a group of thorns of great size; and near the cathedral the trunk of an aged yew, which measures three yards in diameter. From the remains of walls above, and the traces of foundations below the surface of the earth, the town is supposed to have been once pretty large, but the only flet appearing is the road leading from the market place into the county of Kildare. It is in good preservation, being paved with stones placed edgewise, and ten feet in breadth. There are seven churches of considerable antiquity, and some chapels which appear to be of later construction. St. Kevin was the patron saint, and his name consequently is given to many of the surrounding objects. He is said to have founded the town or monastery in the fifth century; but Ledwich attributes the erection to the Olmenn, who infelated Ireland, in the ninth century. Some figures in a chapel, containing the tomb of St. Kevin, furnish some plausible arguments in support of this opinion. There are two round towers at Glendalough, both of which are adjoining churches, but neither the cathedral nor abbey has such an addition, though if a belfry were the object of these buildings, the preference would probably have been given to them. These towers were also, in Mr. Ledwich's opinion, the work of the Olmenn. The arguments for and against this opinion will be considered under the article ROUND TOWERS. A monastery having been founded here, and the supposed miracles of St. Kevin having been proclaimed, numerous footles to his shrine; as Girald Cambrenensis saies, in what had been a barren wilderness, were to be found, after a few years, not only churches and good houses, but much wealth. According to the Irish annals, the town thus founded was often plundered by the piratical freebooters of the north, who, as they fulfilled solely by depredations, without reluctance, frequently pillaged their own countrymen. In 1162, Laurence O'Toole, afterwards archbishop of Dublin, was elected abbot; and in a few years after earl Strongbow granted the abbey and parsonage to Thomas, the nephew of Laurence. The charter is one of the most valuable and ancient in Ireland, as it protects the possessions, privileges, and immunities of the abbey. Previous to this, Glendalough had also had a bishop; but, in 1152, Cardinal Paparo endeavoured to unite it to the see of Dublin. This was refused, and, in 1179, pope Alexander III. confirmed the city to its bishop, saving the rights of the abbot. A letter, written in 1214, is quoted by Ledwich, to shew that Glendalough was at that time become a nest of thieves and robbers. In the reign of king John, the see was united to that of Dublin; but the see of the O'Toole's, who were very powerful, kept it, in some degree, independent until 1497, when the bishop formally surrendered his right and claim in the Chapter-house of St. Patrick, Dublin. The Seven Churches, when approached by the bridge of Derrybown, form a very picturesque and pleasing scene. The bridge is thrown over the Avonmore, and is composed of three elliptic arches. Derrybown, covered to a great extent with an oak coppice on one side, and the huge broccoli on the other,
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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.

GLEN, properly signifies the cavity orocket of the eye.

GLEN more frequently used by anatomists for the shallower cavities of bones, into which some other bone is received and articulated.

By which it stands distinguished from cotyle or acetabulum, which is a deeper cavity, intended by nature for the like purposes.

GLENHEAD, in Geography, a cape of Ireland, in the peninsula of Inis Lowen, county of Donegal. W. long. 7° 41' from Greenwich, N. lat. 55° 29'.

GLENGARRY, a harbour of Ireland, in the county of Cork, on the north-eastern part of Bantry-bay. The arbutus grows in this neighbourhood in great perfection.

GLENARY, 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. 24° W., until it intersects the Ottawa or Grand river, thence descending 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.

GLENICZA, a river of the deely of Warfaw, which runs into the Obra, near Kolon.

GLENKEN'S CANAL, is the parliamentary name of an inland navigation, made since the year 1802, in Kirkcudbright county in Scotland. See CANAL.

GLENLUCY, a town of Scotland, in the county of Wigtion, which sprang from an abbey of Clifertians, founded in 1195, called *Vallis Lucis.* It is situated at the northern extremity of a large bay to which it gives name; 18 miles W. of Wigtion. 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 Sturt. N. lat. 56° 38'.

GLEN, in Anatomy, from γλυκόν, the articular cavity of a bone, and ως, 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. 37° 15'. W. long. 90° 14'.

GLESUM, or Glesum, 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.

GLETHERHORN, in Geography. See JUNGERHOF.

GLIANY, a town of Poland, in Galicia; 20 miles E. of Lemberg.

GLI, a town of Sweden, in West Bohemia; 25 miles W. N. W. of Torna.

GLIGV, a town of Asia, in Daghestan; 50 miles N. of Teshin.

GLIKIEN, a town of European Turkey, in the province of Epirus; 26 miles W. of Arta.

GLINS HOLM, one of the small Orkney islands, which affords pastures; 2 miles S. of Pomona, between that and Burray.

GLIMMER, or CAT-SILVER, in Mineralogy, according to Dr. Woodward, *Method of Fossils,* p. 14, are names for *Mica,* which feef. Glim, spangles, daze, and silver, are other names by which the miners and quarrymen designate the shining 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 contains their whole substance.* In Derbyshire, it is not uncommon to find nodules, or round nells or mafes of mica, in thin and separate plates, in the first, or millstone grit, which fall out on exposure, and leave spherical holes, a circumstance which has, according to Mr. Farcy, given rise to, rock-baths or holes on the tops of large loose blocks of stone where the water flows in many infulances after rain, but not perfectly, as the vulgar opinion is. See ROCK-BASIN.

GLINA, in Geography, a river of Croatia, which runs into the Save; 12 miles W. of Patrini.

GLINNOUGH, a lake of Ireland, in the northern part of the county of Leitrim, from which a small river flows to Sligo bay.

GLINNOVO, a town of Russia, in the government of Novgorod, on the Milla; 12 miles S. E. of Borovitch.

GLINSK, a town of Russia, in the government of Tchemîgof, on the river Sol'; 80 miles S. E. of Tchemigof.

GLINUS, in Botany, derives its name from γλύκον or γλυκόν, a word used by Theophrastus, and denoting a kind of maple, though we cannot trace any similitude between this tree and the little herbaceous plant, to which the name was applied by Lodetling; but it was adopted by Linnaeus.

Gen. Ch. Cal. Perizanth inferior, of five ovate, acute, concave leaves, coloured within, permanent, and downy, Corn: none; neectaries about five, resembling narrow petals, shorter than the calyx, and unequally two or three-cleft.

Stam. Filaments about fifteen, awl-shaped, flat, as long as the calyx; anthers incumbent, oblong, compressed, two-lobed. Pét. Germen of five fides; styles five: short; figmas, simple. Peric. Capsule ovate, with five cells, five fides, and five valves. Seeds numerous, roundish, in a single row at the base of the valves, tubedged, each attached by a long thread-like flalk.


G. lodhi. Linn. Sp. Pl. 663. Bawm. Ind. 112. t. 36. f. 1. *Stem hairy. Leaves ovate.* -Native of Spain, and found by Locellin in a gravelly soil near Toledo on the Tiber. Also on a dried-up rivulet between Merida and Trotullo. Rect annular. Stems procumbent, jointed, hairy. *Leaves ovate, on foot-stalks. Flowers nearly five, crowded together, sometimes on very short hairy stalks. A figure of this species is defined to appear in the Flora Graeca, t. 473, from a drawing made at Smyrna, and from which it appears that what Gartner considered as petals are more probably scale-leaves, as not being external to the flowers, after all, they ought perhaps to be called
barren filaments. They feem, from the dried specimens, to be ranged alternately with the real filaments.

2. G. distansnls. Wildl. Sp. Pl. v. 2. 929. Pluk. Amal. 16. 1. 336. f. 6. — Leaves round, hairy. Stem thrubby, prostrate. Leaflets of the calyx lanceolate. — Native of India. It seems doubtful whether G. distansnls be not merely a variety of Mantiska; but as Willdenow did not keep them separate, on the authority of a dried specimen, we have retained the species.

3. G. setiferus. Wildl. Sp. Pl. v. 2. 929. Vahl. Symb. 3. 64. — Leaves obovate, plaited. Stem thrubby. Leaflets of the calyx ovate. — Native of wooded plants in Arabia Felix during the rainy season. The whole plant is hairy, from very thick hairs, which are longer than in G. ioata. This species was first described by Vahl, from Forlkal's specimen which we have examined. The pubescence is beautifully flecked and very dentate.

GLINUS, in Ichthyology, a name by which Bellonius and some other authors have called a small sea-fish, more commonly known by the name of the eel-canculus.

GLIS. In the common acceptance of the word, this only signifies the dormouse; but Linnæus has used glise in a larger sense: and, in his Syllan of Zoology, makes it the name of the fourth order of the mammalia class of animals. The characters of the creatures of this class are, that they have only two fore-teeth in each jaw; they have no dentes canini, 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 Icthyis, Gopor, Muro, Arctonyx, Sciuros, Myurus, Didelph, Lagctis, and Hareus; which see respectively.

Glis, a name given to several species of Myurus; of Didelphs; of Mus; and of Arctonyx; which see respectively.

GLIS; Pedans. See Vespertilo Spafens.

GLISCHROMICTHES, in Natural History, the name of a genus of compound earths. The word is derived from grs, touch, and injus, mixed. The bodies of this genus are loams composed of sand and a more viscid 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 Ichthyology, 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 or three 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 bentuated as that of the tunny; it lives in deep water, and is a fish of very delicate taste. Gefen. De Pisc. p. 153.

GLISSON, Francis, in Biography, was born at Rampisham, near Dorsethore, in the year 1597, and educated at Caius 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 1633. 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 col leagues to make public. During the civil wars he retired to Colchester, where he practised with great credit in those times of confusion, and was in the town at its memorable siege by the parliametary 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 dieéto," 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. "Anatome Hepatis, &c." London, 1653; afterwards reprinted at Amsterdam and the Hague. This work contains a much more exact description of the liver than had before appeared. The caputle of the venas portaara was first discovered by him, and has ever since borne his name; but Wallis and Pequet 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. 3. "Tractatus de Natura Substantum Energetica, seu de Vita Naturae, ejufque tribus primis Facultatibus," Lond. 1672, in 4to., a profound and laborious performance, in the very depths of the Aristotelean philosophy, with all its numerous divisions, and an extraordinary effort of the understanding in a man of an advanced age. — 4. His last publication, "Tractatus de Ventriculo et Intestinali, cui primum alterius partium continens in genere, et in specie, de illo Adbominis," Lond. 1679, in 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 ardour and success; infomuch that Boerhaave terms him "omnium anatomiearum excjllentissimum," and Haller speaks in praise of all his writings. Aikin Biog. Mem. of Med. Elyg. Dict. Hist.

GLISTER, See CLIVER.

GLITNESS, in Geography, one of the smaller Shetland islands, on the E. coast of Shetland; 11 miles N. of Lerwick. N. lat. 60 22'. W. long. 1° 16'.

GLIJEBEN, a town of European Turkey, in Dalmatia; 18 miles S.E. of Moloar.

GLIZADE, in Fencing, 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 masterly movement in fencing.


Gen. Ch. Cal. Paranther superior, of one leaf, tubular, permanent; its border three-lobed. Cer. of one petal; tube long, cylindrical, slender; outer limb in three, nearly equal, ovo-lobed, 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, divided at its summit; anther oblong, of two distinct parallel lobes, attached by its back to the dilated part of the filament. Pist. German inferior, roundish; style thread-shaped, the length of the filament and embraced by it; stigma capitate. Peric. Capsule roundish, of three cells and three valves. Seeds numerous.

Eff. Ch. Aster in two parts. Filament elongated, incurved, bearing a lobed appendage. Style thread-shaped, the base, embraced by the anther. Corolla with three outer lobes and three inner, the middlemost vertical and cloven.

1. G. marantiana. Linnaeus Mant. 2. 170. Sm. Exot. Bot. v. 2 85 t. 103 (Colebrookia bulbifera; Donn. Cant. 1.)—Appendage of the filament four-lobed, divaricating, terminal. Spike not taller than the leaves. Bracts elliptical, broad, longer than the calyx—Native of Bengal, from whence it was sent by Dr. Roxburgh to the late Lady Amelia Hume in 1820. It flowers in the flower 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 simple 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, simple, erect, more or less lax, about as tall as the leaves, or rather under that height. Bractlets alternate, sessile, 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 bract. These flowers are very transient, slender, orange-coloured, with a deeper spot in the centre of the lip.

G. marantiana Sm. Exot. Bot. v. 2. 115 t. 117. (Decorum of the inhabitants of Nepal.)—Appendage of the filament arrow-shaped, narrower than the anther. Clutter elongated, cylindrical. Bracts 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 likinking, and consists of a long terminal racemes 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. verifolius. Sm. Exot. Bot. v. 2. 116 t. 117; o, b, c. (Hara Siamenium; Koenig in Retz. Obs. s. 3: 49.)—Appendage of the filament four-lobed, divaricating. Clutter somewhat corybiform. Bracts shorter than the calyx. Lip towards the middle of the filament—Found by Koenig plentifully in grassy shady parts of the island called Young Cayon, in the East Indies. The calyx of flowers is shorter and more corybiform 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. marantiana, but the situation of the lip, thril, 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 to us by Dr. Joseph Banks, of the accuracy of which we have no reason to doubt. Koenig mentions a mere dwarf variety, found near the town of Madaca. Can this be what has lately been introduced into the flower about London by Dr. Roxburgh, and which we have seen and examined at Sir Abraham Hume's, and at Meffrs. Lee and Kennedy's, flowering in June 1820? It is figured in Curtis's Magazine, t. 1325, where Dr. Sims has, we think, justly made this pretty plant a new genus, by the name of Mandra sativaria. It differs from Globba 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, different characters of distinction, in the two long linear appendages to the three valves. Seeds numerous.

GLOBE, in Geometry, a round or spherical body, more usually called a sphere; which see. The earth and water together are supposed to form a globe; hence called the terraqueous 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, Restfulness of a. See Resistance. Globe is more particularly used for an artificial sphere of metal, plaster, 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.

Globes 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 these arts.

The fundamental parts, common to both globes, are an axis, representing the polar axis, and a spherical shell or ccover, which makes the body of the globe, on whose external surface the representation is drawn.

Globes, we have observed, are made of divers materials, viz. silver, brass, paper, plaster, &c. Those commonly used are of plaster 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 hcm or halves 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 pasteboard and paper, laid, one by another, on the mould, to the thickness of a crown piece; after which, having fixed to dry and embody, make an incision along the middle, the two caps thus parted, are clipped 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 found together with peckthread, &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 helped in a metallic semi-circle of the size intended; and a kind of plaster, made of whiting, water, and glue, heated, melted, and incorporated together, is daubed all over the paper surface. In proportion as the plaster is applied, the ball is turned round in the semi-circle, the edge whereof passes off whatever is superfluous, and beyond the due dimension, leaving the rest adhering in places that are short of it.

After such application of plaster, the ball hardens 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 gullets, all 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 reflect 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. 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 passes through the poles. 3. The wooden horizon, whose upper side represents the horizon, and is divided into several circles; the innermost whereof contains the twelve signs of the zodiac, falsified into their degrees; the next the Julian; and the third the Gregorian calendar; without side 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 compass 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 interfections. 2. The ecliptic, divided into twelve signs, and these subdivided into degrees. 3. The zodiac. 4. The two tropics. And, 5. The polar circles. All which are 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 show 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, whereon 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° from the poles of the ecliptic. These shoulders are firmly 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 still motion; so that when it is adjusted to any point of the ecliptic, which the equator is made to intersect, 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, which the equator is to intersect, may pass under a 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°, and 66° 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 risings 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: so that by means of a unit and screw, the pole of the equator is made to revolve about the pole of the ecliptic. Phil. Trans. N. 447, p. 201, 202, or Martyn’s Abr. vol. viii. p. 217, and N. 493, art. 16 in Phil. Trans. vol. xi. p. 290.

Mr. Joseph Harris, late almanack-maker of the mint, contrived to remedy the former of the defects above-mentioned, by placing two hour circles under the meridian, one at each pole; these circles are fixed upright between two brass collars placed about the axis, so that when the globe is not turned, they are carried round with it, the meridian serving as an index to cut the hour 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 hour circle prevent the brass meridian from being moveable quite round in the horizon. This globe is also adapted for shewing how the visibilities 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. 456, p. 321, &c. or Martyn’s Abr. vol. vii. p. 332.

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 rhumb-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 crofled 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 Uligh Beigh, 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 brass circle of the terrestrial globe, and about 234 to each side of the north pole, the days of each month are laid down according to the Sun's declination; and this brass circle is so contrived, that the globe may be placed with the north and fourth 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 semi-circular 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. Celestial, is an artificial sphere, 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 juf 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 phænomena 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, and fit for the uses of astronomy. — 1. Allume any two points diametrically opposite to each other, as P and Q (Plate XIV. Astronomy, fig. 117.) and in these fix up arcs, 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. Exploy 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 234 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 234 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, whereas 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 suspenfed, 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 intersection 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.

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 engraved.

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 insert the calendars and winds.

13. Lastly, To the pole A fit a brazen circle, divided into twenty-four horary parts, and numbered twice 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 Circle. Thus 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 whole 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 premise the former as being the most easily 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 pieces, duly pullel 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 234 deg. describe arches, a, b; these will be twelve parts of the polar circles.

5. After the like manner, from the same poles D and E, with the interval of 66 deg. reckoned from the equator, describe
GLOBE.

describe arches \(a, d\); these will be twelfth parts of the tropics.

6. Through the degree of the equator \(e\), 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 compass the complement 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, 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 face the trouble of doing this over again for each globe.

10. A ball, in the mean time, is to be prepared of paper, plaster, &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 nailed on the ball.

11. Nothing now 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 heaven, 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 \(f, h\) 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 ecliptic. 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 let 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 hemispheres with the star, and bring it in a meridional 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 demonstration 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, &c. 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 state of the heavens for that time. 2. Look on the globe for some one star which you know, e. g. the middle off 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 easily note the place there. 4. After the same manner may you 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 ephemerid, 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 ephemerid 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 ephemerid 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 declension, ephemerid 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 ephemerid.

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-
To find the rising, setting and culmination of a star; its
continuance above the horizon for any place and day; to-
gether with its oblique ascension and declension, and its equa-
tor and western amplitude and azimuth. —1. Adjust the globe
of the sun to the place of the heavens at twelve o'clock that day.
2. Bring the star to the eastern side of the horizon: thus will the western amplitude and azimuth, and time of
rising or setting be found, as already taught of the sun.
3. Bring the east to the western side of the horizon: thus will the western amplitude and azimuth, and the
time of setting, be found. 4. The time of rising, substracted from that of setting, leaves the continuance
of the star above the horizon. 5. This continuance
above the horizon, substracted 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-
mination.

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 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 degree
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; turn the globe,
till the sun come to the fame: then will the index show
the time.
The separation of time between the risings of two stars,
or the continuations. —1. Raise the pole of the globe for
many degrees above the horizon, as is the elevation of
the pole of the place. 2. Bring the first star to the
horizon, and observe the time the index points to. 3. The
same do by the other star; than substracting the former
time from the latter, the remainder is the interval between
the risings.

After the like manner is the interval between two cul-
minations 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
point till the sun becomes the meridian; then the
index will show 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
meridian; set the index to twelve at 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
flew the hour of the night.

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To find the beginning and ending of the crepuscular or twi-
light. —1. Rectify the globe, and set the index to the
twelfth 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: the index will then show the
time when the twilight commences in the morning. 3. Taking
the point opposite to the sun, bring it to the easterly hemi-
sphere, and turn it, till it meet with the quadrant of altitude
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
brazen meridian. Then the arc of the equator, between
the first point of Aries and the brazen meridian, shows the sun's
right ascension; and the arc of the brazen 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
decimation on the brazen 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 ascension,
required the sun's declination and longitude. —Bring the sun's
right ascension in the equator to the brazen meridian, then
will the intercepted arc of the ecliptic to Aries show the sun'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-
tinues to shine without intermission at the same 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 fame kind as the latitude of the place;
then on the first of those days in the spring quarter, the
sun ceases to set at the given place, and shines without
intermission 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 longest 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 natural 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
globe on the south frigid zone where the sun begins to shine constantly the latitude
is of the fame kind as the sun's declination.

To determine under what latitude two given stars rise or set at
the same instant. —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 degrees of the meridian, intercepted 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 21st 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
GLOBE.

In the present instance Capella passes about 6 o'clock in the afternoon.

2. Find under what meridian they reckon 6 o'clock when it is 10 with us, which will be four hours to the west.

3. Observe under this meridian the place whose latitude is equal to the declination of the star, which, in this example, is nearly 45°; and this place, which is near Louisburg, in North America, will be the place required.

To explain the phenomena of the harby-moon by the globe, see Morex.

Globe. Terrestrial, is an artificial sphere, on whose surface are delineated the principal places of the earth, in their proper situations, distances, &c. together with their circles imagined on the surface of the terrestrial sphere. The use of the terrestrial globe, is to exhibit the several affections and phenomena of the different places of the earth, depending on magnitude, &c. in an easy obvious manner, without the trouble of trigonometrical calculations.

Globe. To construct a terrestrial,—The construction of a terrestrial globe, whether of metal, plaster, paper, &c. is the same as that of a celestial. The same circles are delineated on both; and as for the places, viz. cities, towns, &c. they are laid down from the longitudes and latitudes given, as the stars are from their right ascensions and declinations.

Hence all problems, depending on the circles, may be equally wrought on either globe; as the affections, declinations, amplitudes, azimuths, risings, settings, altitudes, &c. of the sun; the lengths of day and night; hours of the day and night; crepuscula, &c.

We shall here, therefore, only give what is peculiar to the terrestrial globe.

Globe. Use of the terrestrial. To find the longitude and latitude of any place delineated on the globe.—Bring the place to the graduated side of the hemis meridian: the degree of the meridian it cuts is the latitude required; and the degree of the equator, at the same time under the meridian, is the longitude required.

The longitude and latitude given, to find the place on the globe.—Seek, in the equator, the given degree of longitude, and bring it to the meridian: then count from the equator on the meridian the degrees of latitude given, towards this or that pole, as the latitude is either north or south: the point under this is the place required.

The hour being given at any place, to find what hour it is in any other part of the world.—Bring the given place to the meridian, and let the hour-index to the given hour; then, by turning the globe, bring any place to the meridian, and the index will point to the hour of that place.

To find the anteri, posteri, and antipodes of any place.—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 antecedent. 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 posteri; and the latter, that of the antipodes.

To find what place of the earth the fun is vertical to at any time given.—1. Bring the fun'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 west, 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 fun is then in the meridian; and the opposite half of the meridian will show 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 fun is vertical in the fun.—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 fun is in these points of the ecliptic: for on those days he is vertical to the given place.

To find those places in the torrid zone to which the fun is vertical on a given day.—Bring the fun'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; these are the places required.

After the same manner may be found what people are afei 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 fun'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 find the index to the given hour; turn the globe till the index points to twelve at noon, and the place on the globe which lies under the degree of the sun's declination has the fun then vertical.

A place being given in the frigid zone, to find the time when the fun 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 fenidere intercepted between Capricorn and Cancer, to the north point of the horizon; observe the degree of the ecliptic which cuts that point, and find when the fun enters that degree, and this will give the time when the fun begins to appear in that latitude. Bring the descending part of the ecliptic to the same point on the horizon, and the calendar will show 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 show in the calendar when the longest day begins; and by bringing the descending part of the ecliptic to the same 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. 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 fun rises and sets; where it is noon or midnight; and where day or night.—1. Find what place the fun 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; then will the places on the eastern side of the horizon be those the fun 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 fun's place; by the present problem it may be known 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 is at 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 what parts of the earth the fun 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 whose noon or midnight the hours are numbered. 2. Bring the fun's place for that day to the meridian, and set the index at twelve o'clock. 3. Determine the place of the fun on the surface of the globe, and bring it to the meridian; this index will then show the difference of time between the impulse of the fun and star to the meridian of the place: note the point of the meridian over the place of the fun.

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 west, till the index has passed over the interval of time between the culmination of the fun 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 fun shall illuminate all those regions which he actually illuminates 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 fun as the earth has, that part thereof will be illuminated which is illuminated on earth. Hence also the globe being situate in the same manner, when the moon shines, it will shine what parts are then illuminated by the moon.

And in the like manner, we may find when the fun 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 shew the horizon the point of the compass on which the latter bears from the former.

Problems on the terrestial globe may sometimes be advantageously solved, by considering the horizon as the circle of illumination, and bringing the fun's place to the zenith.

To find for any given day and hour those places where the fun is rising or setting; those places where it is noon, and in particular those place under the fun is vertical; those places where the fun is rising or setting; and those places where it was midnight.—Find the fun'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 fun'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 fun rising, and those along the eastern edge have the fun setting: it is noon to the places under the brazen meridian, and amongst them is the fun is vertical to that place, which stands under the degree of the fun'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 fun 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 seventeen inch globe, he found that those comprehending the sea weighed 249 grains, and the others only 123; whence he infered, 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 ascertain'd. Long's Alston. vol. I. p. 163. See Magnitude of the Earth.

Globe. To confirm all by the. See Dial.

The celestial globe has been improved by Mr. Ferguson; in this globe, (Plate XV. Astronomy, fig. 122,) an arch MKH, of 23°, is fixed on the north pole of the axis, above the hour circle; and at the end is fixed an upright pin HG, flaring
flanking 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 P, on which are engraved the 39½ days of the moon's age, beginning under the wire N, which wire, as it turns round, carries with it the plate F. These 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 same 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 its latitude amounts to at any given time; and for this purpose, S is a small piece of palteboard, 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 5½ 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 float the progres 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 fun'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 plate F; and, lastly, laying the curved edge of the palteboard S over the ecliptic below the moon, and adjusting the moon to her latitude over the graduated edge of the palteboard. Having thus rectified the globe, turn it round, and obverse on what point of the horizon the fun and moon balls rise and set; for these agree with the points of the compas on which the fun and moon rise and set in the heavens on the given day; and the hour-index shews the times of their rising and setting, and also the time of the moon's passing over the meridian. This globe is also contrived for exhibiting the phenomena of the harvest-moon, &c. Phil. Trans. No. 483, art. 21. in vol. xlv. p. 535; or Ferguson's Altnon. p. 251.

Globe, Dialling. See Dialling.

Gloves, Painted, 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. Altnon.) 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 slightly 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 laying 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 Bender semi-circle of brahs, 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 fame. 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 or 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 sliding 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 separably rapped with the following characters: Φ, θ, Φ, θ, θ, 24, 1. 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 23½ degrees to the pedastal, 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 horizon to the latitude of your place on the brazen meridian, and the quadrant of altitude to the fourth point of the horizon; which done, turn the globe with its furniture till the quadrant of altitude comes right against the Sun, viz. to his place in the ecliptic; and keeping it there, let the hour index to the XII. next the letter C.

By this machine the following problems, as well as many others, may be resolved.

To find the amplitude, meridian altitude, and times of rising, culminating, and setting of the fun, moon, and planets.—Turn the globe round eastward, or according to the order of the signs; and as the eastern edge of the horizon comes right against the fun, and any planet, the hour-index will shew the time of its rising; and the inner edge of the ecliptic will cut its rising amplitude in the horizon. Turn on, and as the quadrant of altitude comes right against the fun, moon, or planets, the ecliptic cuts the meridian altitudes in the quadrant; and the hour-index shews the times of their coming to the meridian. Continue turning, and as the western edge of the horizon comes right against the fun, moon, or planets, their setting amplitudes are cut in the horizon by the ecliptic; and the times of their setting are shewn by the index on the hour-circle.

To find the altitude and azimuth of the fun, moon, and planets, at any time of their being above the horizon.—Turn the globe till the index comes to the given time in the hour-circle; and keep the globe steady, and moving the quadrant of altitude to each planet respectively, the edge of the ecliptic will cut the planet's mean altitude on the quadrant, and the quadrant will cut the planet's azimuth, or point of bearing on the horizon.

The fun's altitude being given at any time either before or after noon, to find the hour of the day, and the variation of the compas, in any known latitude.—With one hand hold the edge of the quadrant right against the fun; and, with the other hand, turn the globe westward, if it be in the forenoon, or eastward if it be in the afternoon, until the fun's place at the inner edge of the ecliptic cuts the quadrant in the fun's observed altitude; and then the hour-index will point out
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, shows the variation of the compass in that place of the earth. Ferguson's Alton. p. 292, &c.

GLOBE Amaranth. See Gomphrena.

GLOBE Animalcula, in Natural History, is a singular, minute, aquatic animal, whose form seems exactly globular, without either head, tail, or fins. It moves 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 five, some one, two, three, four or five, and others no spots at all. These spots are probably the eggs or young ones of the animal. The general appearance of the body exhibited a kind of short movable 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 Fijb, in Ichthyology, a name by which some species of the order are called. See Ostracion.

GLOBE Flower, in Botany. See Sphagneticus.

GLOBE Ranunculus. See Trollsii.

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 rhomb-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 hand-maps, made according to this projection, would indispensably have great advantages above those made in 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, whereby the meridians, parallels, and particularly the rhomb-lines, are all straight lines; inasmuch as straight lines are found more easy to draw and manage than curves, especially such as rhomb-lines on the globular chart are. This projection is not new, though not much taken notice of till late. It is mentioned by Ptolemy in his Geography; as also by Blundeville, in his Exercises. 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 disk; proper perianth of one leaf, tubular, five-cleft, 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, cloven, shorted; the lower consisting of three larger, equal segments. Stam. Elements four, simple, as long as the proper corolla; anthers distinct, incumbent. Pijf. German superior, ovate; style simple, the length of the stamens; stigma obtuse. Peric. none; proper calyx, flutting up and enclosing the solitary, ovate flower. Common receptacle elongated, divided by scales. Eff. Ch. Common calyx imbricated; proper one tubular, inferior. Partial corolla with the upper lip cleft; under one three-cleft. Receptacle chaffy.

1. G. longifolia. Long-leaved Globularia. Willd. Sp. Pl. v. 1. 539; (Allysum five Herba terrabilis; Sloan. Jan. v. 1. 19. t. 5. f. 3.)—"Stem shrubby. Leaves linear-lanceolate, 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 pitch, 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 bluish color. Seed pappus, all over downy.

2. G. Alypum. Herb Terrible. Linn. Sp. Pl. 139. (Allysum montis Ceti; Ger. em. 526.)—"Stem shrubby. Leaves obovato-lanceolate, three-toothed or undivided. Heads of flowers terminal."—A green-house shrub, found in various parts of the south of Europe, flowering from August to November. Root woody. Leaves alternate, fascicled in the lower axils, 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. biflagella. Linn. Sp. Pl. 139. (Scabiosa biflagella five Frutecfes: Pluk. Amalt.h. t. 58. f. 5.)—"Stem shrubby. Radical-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. Linn. Sp. Pl. 139. (Aphyllanthes anguillara; Camer. Hort. t. 7.)—"Stem herbaceous. Radical-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 span high, terminated by a head of deep blue flowers. Willdenow mentions two varieties of this species, one with a leafless stem, the other with slender flowers.

5. G. frigida. Linn. Sp. Pl. 139.—Radical-leaves crinate; petiole; stem-leaves entire, pointed."—Native of Spain, Albinus having gathered it in Granada. It flowers in May.

—Radical-leaves numerous, small, fluff and notched, each sepal ending in a prick. Flowers composing an oblong sphere, hairy.—We are not acquainted with any figure of this species.

6. G. cordifolia. Linn. Sp. Pl. 139. Jacq. Anfr. 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. nutans. Willd. Sp. Pl. v. 1. 542.—"Flower-talks 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. Noeben.

Root woody and very thick, bearing numerous tufts of little leaves, among which arise the short, solitary flower-talks. Flowers forming a terminal head.—It has never been figured.

FLOWER.-Flower-flask about six inches long, smooth, filleted, purplish towards the top, bearing a roundish head of blue flowers.

GLOMERULAE, in Gardening, contains plants of the herbaceous, flowery, perennial kind; of which the species chiefly cultivated are the three-toothed globularia (G. ajupum); and the common globularia or blue daisy (G. vulgaris); but others may be easily raised.

There are two varieties of the half fort, one with a white flower, and another that has a leaves item.

Method of Culture.—In the first it may be effected by planting cuttings of the young branches in April, July before they begin to flower, in pots of light earth mould, plunging them in a very moderate hot-bed, and giving them due water and shade, till they have fully rooted. 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 fort may be readily increased by parting the roots, as in the common daisy, planting them out in the early part of the autumn, in moister 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 sphenoe.

Thus the red particles of the blood are called globules of the blood, on account of their redness and fineness. (See Blood.) The Carteians call the particles broken off the matter of the first element, globules of the second element. See CARTEIAN, &c.

GLOBULARIS, NASS, is used for the lower, flexible, cartilaginous part of the nose.

GLOCHIDION, in Botany. See Braulia.

GLOSETZI, in Geographical, a town of Walachia; 50 miles N. of Bucharest. N. lat. 49° 13'. E. long. 26° 16'.

GLOGAU, a principality of Silelia, on the 8th side of the Oder, bordering on Poland; producing corn and wine, in abundance, in some parts affording mines of iron. The pastures feed many sheep, 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 belonged to the king of Poland, to the king of Bohemia, to the emperor, and last of all to the king of Prussia.

GLOGAU, Great 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 commandant, 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° 37'. E. long. 16° 5'.

GLOGAU, Ober, or Little, a town of Sileilia, in the principality of Oppeln; 19 miles S. of Oppeln. N. lat. 53° 16'. E. long. 17° 48'.

GLOGNITZ, a town of Austria; 28 miles S. of Vienna.

GLOKEN-SPESSE, in Mineralogy, a term used by the Germans to express a sort of impure regular of bifinith, obtained by accident, sometimes in the making of found'. The bifinith 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 colour. This is bifinith, with an admixture of the earth of cobalt, and other extraneous matter. They sometimes call this whole matter by the common name of especific; but more usually they separate it into two parts, and call the under part, which is most solid, gloken-specific, and the upper part they distinguish by the name of as caladurn.

GLOMERELLS, in our Old Writers, comminatories appointed to determine differences between scholars of a school or university, and the townsmen of a place. In the edict of the bishop of Elly, anno 1276, there is mention of the matter of the glomerells.

GLOMMES, or GLOMEN, in Geography, called also the Star Els, or great river, the chief river of Norway, springs from the lake of Osefond on the north of the Farnund, and after running a course nearly south about 500 British miles, discharges itself into the Northern Ocean near Frederikshafi, 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 Warne, which issues from the lake Miof, it is about as broad as the Thames at Henley. In its course it presents a broad surface, sometimes watering pleasant valleys, sometimes intercepted by sand-banks, over which it frequently shifts its course, sometimes 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.

GLOM, a river of Bavaria, which runs into the Ammer, near Cranzberg.

GLOS, a town of France, in the department of the Ouren, and chief place of a canton, in the district of Liege. The place contains 1,560, and the canton 8,550, inhabitants, on a territory of 1075 square kilometres, in 23 communes.

GLORE-FAT, in Rural Economy, a term applied to animals that are extremely fat.

GLORIA PATRI, in the Liturgy, a formula of words repeated 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 Damasus is commonly said to have first ordered the rehearsal of, or rather, singin 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 allows to have been more obscure, and that it did not become popular till after the rise of Arrianism, 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 rehearsed in the churches of France, and after the Gloria Patri shall be added sanctus in principio, as is done at Rome, in Africa, &c. on account of the heretics, who say,
fay, that the Son of God had his beginning in time."—Pleury.

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 Methonia, in which he has been followed by Jussieu, and indeed by all French botanists, though the Linnean school have refused to adopt this barbarous name.—Linn. Gen. 164. Schreb. 220. Willd. Sp. Pl. v. 2. 95. Ait. Hort. Kew. v. 1. 343. Mart. Mill. Dict. v. 2. Germs. t. 18. Jaff. 48.—Clas. and order, Hexandria Monoicy. Nat. Ord. Sarmentosae, Linn. Lilia, Juss.


1. G. superba. Superb Lily. Linn. Sp. Pl. 437.—Res. Lilac t. 26. "Leaves furnished with tendrils."—Native of Malabar and Guinea. It was introduced into Kew Garden in 1690 by the first earl of Portland. A tender herbaceous 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-stalk from the base of each leaf. Leaves alternate, smooth, each ending in a tendril. Flowers pendent, of a most beautiful red and yellow colour. Petals lanceolate, long, waved at the edge, reflexed near the base. This remarkably handsome plant requires 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.

Obf. This very beautiful genus is nearly allied to Erythro-rium.

GLORIOSA, in Gardening, comprises a plant of the herbaceous, flowering perennial kind; of which the species cultivated is the superb-lily (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 lemons decay, or in the early spring before they shoot, in pots filled with light earth, plunging them in the bank of the flume. The old roots, when taken out of the ground, should be preserved in dry sand during the winter in the flume, 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 lemons 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 lemons. Two-penny pots will be large enough for the roots of the greatest fixed plants of this nature.

The plants afford much effect by their beautiful flowers among those of the flume kind, when properly intermixed with them.

GLORIOUS ISLANDS, in Geography, two small islands in the Indian sea. S lat. 11° 35'. E. long. 27° 15'.

GLOSAR, a small island in the Baltic, E. of Aland. N. lat. 60° 20'. E. long. 20° 15'.

GLOSAR, 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 Rumphius, comes from sphenos, tongue; the office of a gloss is to explain the text, as that of the tongue is to discover the mind. Others derive it from the Latin glossa, a fletter or note; which among lawyers sometimes stands for litter; the gloss being, as it were, litter to the text.

Nic de Lyra compiled a polit or gloss on the Bible, in six volumes folio. The French fay, proverbially of an ill comment, that it is gloss d'Orleans, 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 intermediary gloss for the understanding of Junvenal, Horace, Sallust, Persius, &c.

Gloss is also used in matters of Commerce, &c. for the further, bulky, 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 Archaeologicum, 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 six volumes, Paris, fol. 1735. Bald, 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 set 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 vol. 8vo.; which, however, contains some matter not common to either of the preceding. This abridgment is exceedingly rare. At a caution to the purchasers of the Greek Glossary, we inform them that in the article "Moneta" (coins, vol. iv. p. 924.) 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.

Lindenburg has a Glossary on the laws of Charlemagne, &c.

GLOSSOCATOCCHOS, in Surgery, an instrument for depressing the tongue. It is described by Paulus Aegineta, and the term is derived from γλωσσα, the tongue, and κατεχω, to hold.

GLOSSOCELE, denoting a swellling and protrusion of the tongue. The word comes from γλώσσα, the tongue, and κελε, a tumour.

GLOSSOCOMA, a retraction of the tongue.

GLOSSOCOME, in the Instrumental Music of the Greeks; a name given by the ancients to a kind of cithara for the glottides or tongues of their flutes, which probably were lutanists, and, consequently, their glottis was a reed. See Glottis.

GLOSSOCOMON, in Mechanics, is a name given by Hip-
ero, to a machine composed of divers dented wheels, with pinions serving to raise huge burdens.

Glossoscolex, a term in Surgery, derived from γλωσσ-, the tongue, and κεκαλωμενος, to guard; originally a caife for the reed of a hawthorn, but used metaphorically to signify a caife for a fractured limb.

Glossodia, in Botany, (ξυγονειδες), 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.—Chafis and order, Gynandra Monogynia. Nat. Ord. Orchides.


1. G. major. Brown 326.—' Appendage cloven half way down, its lobes spreading, acute.'

2. G. minor. Ibid.—' Appendage cloven to the base; its lobes parallel, obtuse.'

Both species are natives of the country near Port Jackson, New South Wales. Their fums are undivided, with a laminated coat, and grow in the earth, not parasitically. Herb hairy. Leaf folfary, radical, its base enclosed in a membranous sheath. Stalk radical, bearing generally one blue flower, rarely two, and furnished with one bradca besides what accompanies each flower. Brown.

Glossoides, in Natural History, a name given by some authors to a species of flocne, resembing the figure of the human tongue. This is a mere accidental configuration of a common flint or pebble, perfectly indeterminable in size and colour, and owing its form to no animal mould, as the fiones found in fheels usually do, but is a mere lufus nature in the concretion of the fione.


Gen. Ch. Cal. Perianth superior, of one leaf, turbinate, four-toothed, permanent. Cor. Petals four, equal, lanceolate, acute, much longer than the calyx, recurved. Nectary a ring round the base of the style. 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. Pijf. Geren inferior, obovate; styie thread-shaped, as tall as the flamen: fignias four, acute. Peric. Drupae pear-shaped, of one cell, crowned by the calyx. Seed follicary, ovate, flariated.


Obf. The above characters appear to be taken by Schreber from Aulebit, nor have we any better materials. The only species known is,

1. G. arborefoeue; Willdenow. (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 variously, leafy. Leaves opposite, elliptical, pointed, entire, six inches long, thick and firm, of a shining green, placed on short stalks, with a deciduous fruip at each side of their base. Flowers white, on short, umbellate, axillary stalks, their petals about half an inch long. This plant is found in the extensive forests of Guiana, about the habitation of the natives. Nothing is recorded respecting its qualities or uses.


Gen. Ch. Cal. Perianth 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. Pijf. Geren roundish, encircled by a glandular ring, which bears the petals and flamen: styie none; fignias five, acute. Peric. Berry roundish, with five furrows, of one cell. Seeds five, angular.

Eff. Ch. Ca//y: half inferior, with five teeth. Petals five, each bearing an inflexed longitudinal appendage. Berry with five feeds.

Obf. Schreber, p. 826, suspects this genus not to be distinct from Atrala, but the habit confirms Jullien's opinion, which separates them widely. Two species are described by Aublet.

1. G. glabrum. (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, shining, and smooth, with a branching rib, and five transverse veins at the back. Flowers yellow, small, many together in foliary axillary umbels. Berry black, globular.

2. G. tomentosum. 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 Giottopetas, in Natural History, called also ixibonunada, sbarb's teeth, dog-sifs teeth, &c. a kind of extraneous fossil, 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 solido, content; Ol. Wormius, Diert, de Glofopeira; and Reyfehius, De Glofopetis Lunebergenfibus, treat of them at large.

The vulgar notion is, that they are the tongues of serpents petrified; and hence their name, which is a compound of γλωσσ-, tongue, and φηνες, stone. Hence, also, their traditional 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 *exypus,* and the moderns the *shark or sea-dog.*

Camarius cannot persuade himself that the glosophetra found in England, Malta, and round Montpellier, were ever the teeth of a sea-dog, or any other fish. The chief difficulty, he suggests, 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 him so long buried under ground, it is no wonder they should have lost the best part of their volatile principles. It is certain, that human bones and flints, long interred, do not afford nearly the quantity of those principles that they would have done immediately after the person's death.

Another fable, proposed by Camarius is, that the glosophetra, when exposed to the naked fire, turn to a coal; and not to ashes; contrary to what is affected by Fabius Columa. Dr. Woodward answers, that it is likely enough the glosophetra, 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 different species of sharks, afford a vast variety of these fossil substances. Their usual colours are black, blue, white, yellow, or brown; and in shape they usually approach to a triangular figure. Some of them are simple; others are tricuspit, 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 strata of blue clay, though sometimes also in other strata, and are frequent in the clay-pits of Richmond and of Sheppy 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 strata they rarely occur. Mr. Farey has found them in these strata 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 Hærefield, near New Malton, &c.; in a green sandy stratum below the chalk, N. of Dumfriëths, &c.; in the Stonesfield and Collywellen flints series, above the Bath free-lime rocks, at Elstone in Oxfordshire, where Woodward procured specimens of these teeth in the jaw, &c.; and in the thick grey limestone rock which lies under and surrounds the South-Wales coal basins (Phil. Trans. N. 334.) Glosophetra 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 strata these belong, and they should therefore be carefully distinguished from such as are actually found in the strata.

The Germans attribute many virtues to these fossil teeth; they call them cordials, Fowler's, and alephormans: and the people of Malta, where they are extremely plentiful, hang them about their children's necks to prevent 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 at them to its mouth, may, by their hardness and smoothness, be of the same use as a piece of coral. See *Serpent's Tongue.*

GLOSSO-PHARYNGEUS, in *Anatomy,* from *exypus,* the tongue, and *exypus,* a name given to those fibres of the constrictor pharyngis superior, which arise from the side of the tongue.

GLOSSO-SPATHA, in *Surgery,* an instrument, called by some *speculum linguae,* 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 silver spoon is made to supply the place of this instrument in most cases, and answers the purpose very well. Whichever is used, care should be taken to depress very gently, to avoid giving 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.

GLOSSO-STAPHYLINEUS, in *Anatomy,* from *exypus,* the tongue, and *exypus,* another name for the constrictor pharyngis superior. See *Dilatation.*

GLOTTIDES, from *glosa,* the tongue; it is the opening through which the air passes to and from the lungs in respiration. In this passage the voice is formed. See *Dilatation and Larynx.*

Julius Pollux makes the glosis a joint or part of a flute, and Helychius says that the glosis were little tongues, acted upon by the breath of the player. This description of Helychius seems to confirm the idea of the ancient nomadic 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-shank, but larger and longer legged, and generally known by the name limaja. See *Scolopax Limaja.*

GLOUCESTER, in *Geography,* a city in Gloucestershire, England, is situated in a vale, on a gentle eminence, rising, on the east 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 dislocations of their own empire occasioned them to quit the island. Its government then reverted to the British princes, under whose domination it continued till about the year 577, when, according to the Saxon Chronicles, it was surrendered 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 part of the county. Under the Saxons it acquired the appellation of Gloce-cilcum. The strength and consequences of the city rendering it an object of frequent enterprise, its vicissitudes several times the scene of actions 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 670. This restoration was so perfect, that Bede informs us, it was embellished, about the commencement of the 8th century, as one of the noblest 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 Worceler, 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 ages, 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 1263, appointed Sir Maci de Beauf, 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 exercise the duties of his office in holding a county court, but was suddenly interrupted by De Beauf, 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 refuge and revenge; in a few days they obtained an entrance, and compelled De Beauf to retire to the keep; he afterwards surrendered, and was sent as a prisoner to Erfedey castle, in the marches of Wales. In the year 1278 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 course of the two next centuries, four parliaments were held here. The opposition of the Glouchestrans 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 resisted 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 Litchfield into a bishop’s see, and included Gloucestershire within its diocese. This bishopric was soon afterwards divided into the five smaller of Litchfield, Dorchesteth, 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 30, 1539, erected afterwards episcopal 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 vil and county of Bratford, as formerly was in the diocese of Worcester, should be from thenceforward 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 Wolphierce, first Christian king of Mercia, and Ethelred, his brother and successor, 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. Serle, 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 mostfavoured of its architects. The era 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 preferred 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 1330. The building of the north transept and choir commenced about the same year; the latter was completed in 1457. Between the years 1551 and 1590, the elaborate claustra were finished. The chapel of our Lady was built between the years 1457 and 1498; and the centre tower between 1457 and 1516. 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 intercession of the nave and transepts rises a high tower, and on the south side is a handomе projecting porch. The roof is finished 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-west 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 masonry left it. The architecture of this subterraneous and gloomy place is marvelly alive, and united 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 ponderous round columns, and the rows of semi-circular arches above, impreses the mind with ideas of the strength, solidity, and profound solemnity which must have accompanied its original state. The architecture of the west end is very different from the other parts of the nave; and the vault is covered by intersecting ribs, and ornamented key-stones; but the remainder is of the plainest description, with three ribs only to each pillar; yet the key-stones are carved. On each side are eight massive columns; the arches between them are bounded by large mouldings, carved into zig-zag and other ornaments. Directly over each column, and at some distance, is a range of heads of various characters; some serpents, and others terrible. These serve as brackets to claustra of short pillars, whose capitals display the most beautiful variety of foliages, on which zig-zag strigings 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 west 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 most elaborately and exquisitely adorned by pillars, buttresses, niches, pinnacles, foliage, and pendants, and the singular 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 gradation of style is exhibited in the interior of the south transept; but the most perfect and ornamental degree is displayed 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 follows: entire length, in feet, one hundred and thirty-five; breadth, forty-four feet two inches; height, fifty-seventh feet seven inches; breadth of the north aisle, twenty feet ten inches; height, forty-four feet six inches; breadth of the south aisle, twenty feet ten inches; height, forty-two; length of the south transept, fifty-six feet; breadth, thirty-four feet five inches; height, eighty-five feet; length of the north transept, forty-six feet; breadth, forty-three feet five inches; height, seventy-eight feet; length of the nave, three hundred and sixty three feet; breadth, thirty-four feet; height, thirty-four feet; length of the east front, forty-eight feet; breadth, forty-three feet; height, seventy-eight feet; length of the west front, thirty-four feet five inches; breadth, forty-one feet; height, thirty-four feet.

This cathedral contains several curious specimens of monumental sculpture. On the tomb of Edward III., which was erected by his son and successor, and exhibits great perfection of art, is a recumbent figure, in albaliaster, of the deceased monarch, regally robed and crowned. Another monument, worthy of notice, is that to the memory of alderman Blackleach, and his wife, whose figures, in white marble, lie on a table tomb, dated 1639, and seem accurate copies of the portraits by Vandyke: they are evidently the work of a skilful artist. A third, deserving observation for its design and classy style, displays a group by Flaxman, erected to commemorate Mrs. Morley, who died at sea, in childbirth: the figure 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 abbots Perker to perpetuate the memory of king Osfie: and in a chapel nearly opposite, is a figure, supposed to represent the unfortunate Robert Curthos, duke of Normandy, and eldest son of William the Conqueror.

The walls that surrounded Gloucester are mentioned in the ancient history, attributed to Merlin; and tradition ascribes them to Cisfa, the second king of the south Saxons. The Norman conqueror caused them to be strengthened and embattled: and they were again repaired in the twentieth of Edward III. Leland describes Gloucester as "well-built of stone, and strongly defended with walls, where its is not fortified with the deep lime of five years. The walls were completely demolished after the Reformation; and the only memorial of their former strength now remaining is the Well 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 1701; 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 200 separate cells; 164 for men, and 30 for women.

In this city and its suburbs were formerly eleven parochial churches; but only five 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 parish is a Blue Coat hospital, so called from the similarity of its regulations to those of Christ Church, London, 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 1755. 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-dressing busses, 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 Tilliby, in the year 1626, and is now carried on to a far greater extent than at any other place in England; there being nine manufactories, which furnish employment to about 1500 persons. The pins conveyed annually to the metropolis, are said to amount to the value of £5,000; but the principal demand is from Spain and America. A bell-foundry has been established here above three hundred years. The clothing trade, formerly the chief support of the inhabitants, is now nearly lost; on fulling 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 same 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 steward, recorder, town clerk, two sheriffs, common-council, &c. The title of mayor still occurs in the year 1483. The high rewards have generally been perquisites 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 Booth-hill, which is also appropriated to the aldermen and other county business. The public affairs of the city are transacted at the Thofley, 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 function of the gate which originally stood at the bottom of each, as East Gate street, Well Gate street, North Gate street, and South Gate street. At the intersection of the streets, formerly stood a large and beautiful church; but falling to decay, and impeding the passage of carriages, it was removed in 1752; 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 prescriptive right; but those now held, on Wednesdays and Saturdays, were chartered by Henry III. Three fairs are held annually and much frequented. The fairs
GLOUCESTER.

houses 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 incarce has been regular. On the left entrance, under the act of 1804, the houses, in the city alone, amounted to 1,368, the population to 7,265; the inhabitants of the suburbs being 1,500 more. Gloucester is situated 166 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 Brut, to his own time, the reign of Henry III.

On the north-west side of Gloucester is the celebrated isle of Alney, 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 frufts of Gloucester are the remains of Lanthea 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 Bohuns, earls of Hereford, who were great benefactors to the priory. Ruddor's History, &c. of Gloucester. Beauties of England and Wales, vol. v.

GLOUCESTER and Berkei Canals is the parliamentary name of a canal of very large dimensions, following the E. side of the Severn river between Berkeley and Gloucester, of which Mr. Robert Mylne and Thomas Dafford were the engineers; the other particulars will be found in our article CANAL.

GLOUCESTER, or Cape Ann, a township of America, in Essex county, Massachussetts, whose east point forms the N. side of the bay of Massachussetts. It contains 5,133 inhabitants, and is divided into five parishes, besides a society of Universalists. It is a port-town and a town of entry. The harbour is open and accessible to large ships, and it is one of the most considerable fishing towns in the commonwealth. At the harbour, properly so called, are fitted out annually from 60 to 70 bankers, and from Squam and Sandy bay, two small out-ports, the bay fishery is carried on with great spirit, 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 glass. The harbour is defended by a battery and citadel erected in 1705:—16 miles N.E. by E. of Salem, and 34 N.E. of Boston.

GLOUCESTER, the N. westernmost township, and the largest, in Providence county, Rhode island, being 114 miles square, containing 4009 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 fish, eel, perch, parr, and perch. Its adjacent islands are Red Bank, Pett, and Old Man's creek. The full 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, bay, corn, lumber, butter, cheese, &c. It is divided into ten townships, viz. Woodbury, Waterford, Newtown, Gloucester township, Gloucester town, Deptford, Greenwich, Woodwicb, Egg harbour, and Galloway. Malicus river divides the county from Burlington, and is navigable 20 miles for vessels of 60 tons. Maurice river runs southly about 40 miles through Cumberland county into Delaware bay, and is navigable for vessels of 150 tons 15 miles, and for flat-boats 10 miles further. It contains 16,115 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 port-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 Rappahannock river, which separates it from Middlesex, E. by Matthews county and Cheapsake 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 20 broad, and contains 357,260 free inhabitants, and 4909 slaves. The low lands produce excellent barley, and Indian corn, the flax produce of the county.

GLOUCESTER HANY, a plantation belonging to the Hudson company, situated in New South Wales, on the N. side of the waters which form a communication through a chain of small lakes, between Winnipeg lake and Albany river. Henley house 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 Rondeau.

GLOUCESTER, Cape, a cape on the S. coast of Terra del Fuego.—Also, a high promontory on the E. coast of New Holland. S. lat. 19° 51'; E. long. 148° 11'.—Also, a cape on the coast of New Britain. S. lat 5° 54'; E. long. 148° 15'.

GLOUCESTER ISLAND, an island in the S. Pacific ocean, about five 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 deficient of canoes. S. lat 19° 11'; W. long 146° 4'.

GLOUCESTER, Duke of, ISLANDS, 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 situation of them was a lip 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 hand. The other island very much resembled this, and is distant from it about five or six leagues; they lie W.N.W. and E.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° 15'; the variation 5° E. These islands are probably the land seen by Quivo, 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
pied by the Romans. Mr. Fosbrooke (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 Painswick, Bibury, Sapperton, Woodchester, Uley, Kingscote, and other adjoining places, was much peopled with 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 positions; 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 Icknield street, the Erming or Erming street, the Foshs-way, and the Via Julia. Under the dominion of the Saxons, Gloucestershire formed part of the Mercian kingdom, and Winchcombe and Kingstanley are mentioned as residences of the Anglo-Saxon monarchs. On the division of Mercia into five biophilips, after the conversion of the Saxons, the greatest part of this county was included under that name Wicceca, and from this appellation the Dobuni, the early inhabitants of this part of Britain, were afterwards termed Wicceca.

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, amounted to 375,276; of inhabitants, 187,162; of which 90,237 were males, and 96,927 females. The whole county, with the exception of the chapelry of Iscomb, and Cowleyborne, is included within the diocese of Gloucester; which comprehends one arch-deanery, and ten deaneries. The number of representatives returned to parliament are eight; two for the shire, two for the city, two for Tewkesbury, and two for Cirencester. The principal aspect of Gloucestershire is greatly diversified; nature having divided it into three districts of very dissimilar 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 Derbyshire, and passing through this country with a smaller elevation into Wiltshire; 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 202,000 acres. The surface is hilly; and the climatic, considering the natural elevation of the land, unusually mild. The sides of the hills abound with springs; and almost every dip has its rill, and every valley its brook. The principal object of the Cotswold habitancy is sheep; these have been long famous; and it is a prevailing tradition, that the Spaniards originally procured their breed of fine woolled sheep from these hills, though this tradition 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 usually subdivided into the Vales of Eyemah 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 Forefield 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 ambassador was purposely sent from Spain to procure its destruction, either by negotiation or treachery. It also abounds in bees; and the soil is considered as peculiarly favourable for the growth of the Stire 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 45,000 acres, of which above 14,000 were woodland. Several thousand acres have, however, been granted away, by different sovereigns, and disafforested. The names have distinct 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 Horsey and Gloucester. The Severn, the second commercial river in England, renders essential service to a large portion of the county. It enters Gloucestershire near the ancient town of Tewkesbury, where, uniting its waters with the Upper Avon, and pursuing a south-westerly course, it traverses a wide vale, which is rich in pasturage, and in some places abundantly wooded. About one mile above Gloucester, it divides into two streams: these again unite a little below the city, forming the tract of land called Alney island. In the course of its passage through the county, it receives the streams of the Upper Avon, the Chelt near Wainscoat, the Leden near Over's bridge, 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 speculations with the Londos and Bristol merchants for many generations; but was not completed till near the close of the last century, an act for that purpose was obtained in 1783, 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 devours 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 120 feet 6 inches. The Stroudwater canal encounters many obstacles; yet in defiance of all opposition, an act was obtained in 1777, under the operation of which it was finished.

The manufactures of Gloucestershire are numerous: clothing, linens, blankets, rugs, carpets, drokings, &c. are made in different parts of the county. Bar iron, edge tools, wire, nails, and many other articles, are also manufactured in large quantities. Near Bristol are some extensive furnaces, as well as different works for making bricks and wire, vitreil, redlead, Cornishmenes, &c. At Gloucester, vast quantities of pins are made, and at Frampton Cotdes is a considerable

GLOVE: Chirotheca, 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 shamoyn, kid, lamb, doe, elk, buff, &c. There are also perfumed gloves; washed, glazed, waxed gloves; and white, black, uncolour, &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 dreesing and sewing, as much as of cutting.

By 34 Geo. III. c. 10, the British duty on gloves and mittens imposed by 25 Geo. III. c. 55, is repealed, except the duty on licenced; 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 manufactured leather gloves or mitts shall not be imported, under the penalty of forfeiture; and the importer or seller incurs, besides forfeiture, a penalty of 200. with double costs.

Glove, to throw, was a practice or ceremony very usual among our forefathers, being the challenge whereby another was defiled 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 sales 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 Chaldee paraphrase calls glove what the common version renders by shoe. He adds, that the rabbinis interpret by glove, that passage in the eviuth Phalim. "In Idumean extendam calencaum tov marb, Over Edom will I call out thy shoe." 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 had the force of a mutual engagemnt on each side to meet at the time and place which should be appointed by the king, parliament, or judges.

The fame author afferts, that the custom which obtained of helling gloves, in the coronation of the kings of France, is a remain of the ealern practice of giving possession with the glove. Lib. xvi. p. 1017, &c.

The delivery of a glove was in frequent use formerly, as a symbol of investiture. See Du Cange, Gloff. Lat.

GLOVES were also used to signify the reward's or bailiff's fee, or part of the price of the invelliture or purchase-money of the land. "Si aliquam territorii partem vendendi contigi, domini venditiones habebunt; hellacet, tot demaries quot venefor inde habuerit solidis. Major vero terro illius pro exitu recipient duo dariarios." Where quake signifie gloves, or, in French, gants.

Hence the common custom, in many bargains, of giving ferrants money for a pair of gloves.

"Anciently it was prohibited the judges to wear gloves on the bench; and at present, in the fables of most princes, it is not safe going in without pulling off the glove."

GLOVER, Richard, in Biography, was born at Lon- don in 1712. He received the elementary instructions in classical learning at Chalm, and exhibited a considerable talent 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 caufe. 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 Lyttlet- ton and others with high applause, and very soon passed through three editions. "But it labours," says the critic, "under that want of interel which attends all modern epics, especially such as are built up on some of the fabulous 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 fubstituted, 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 "Hofier's Gloff." Mr. Glover was not only a poet but an ardent politician, and was distinguished in various instances for his eloquence in the cause 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 pro- gress 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 pacific commerce in an obscure situation. The duchess of Marlborough bequeathed 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 sat as member for Wey- mouth, in the parliament of 1761. His commercial knowl- edge 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 ability he was complimented with a valuable present of plate. He died in November.
November 1785, and left behind him another poem, entitled the ‘Athenaeid,” relating, in thirty books, the wars between the Greeks and Perians. This was published in 1788, in three volumes 12mo., but it failed completely in attracting public attention.

Glovers, in Geography, a township of America, in the state of Vermont and county of Orleans, N. E. of Crafts-

Glover’s Refs, rocks on the bay of Honduras. N. lat. 15°. W. long. 88° 20'.

GLOW-WORM, in Entomology. See Cicindela. Catharisi and Cicindela have been often used, indiscriminately, for the glow-worm; but they form two distinct genera of the same order in the Linnean 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 issuing from it, and is not commonly supposed to be at all of kin to the glow-worm.

The female is what we expressively call by this name; this is a very slow-paced animal, without wings, and somewhat resembling a caterpillar; the head is small, flat, hard, and black, and sharply towards the mouth; it has short antenna, and fix moderately long legs; the body is flat, and is composed 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 lambent flame, that is seen near the tail, issuing 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 shew itself through several substances, in which the creature may be put up; a thin pillow easily shews it through, and even though 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 very faint; after some the light begins to return, and with it the life and motion of the animal. The motion and light of this creature seem, in some measure, to depend upon one another; it never shews when the body is not in some sort of action; and when it shews most, the body is extended to one third more than its length in the day-time. In the time of brightest shewing, 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 issuing from the tail of a glow-worm; first, that it is phosphoric, and secondly, that its use is 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 subsists 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; lively, comparatively small, differ from the female in appearance, probably also as did the fish from her habits, pursuits, 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 dreads the ground. They might never therefore be brought together, 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 sources of art anticipated. One grand operation of chemistry is the making of phosphoric; 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 male, but kindled; and caused to emit a feady and genial beam, for the purpose which is here stated, and which I believe to be the true one." Paley’s Natural Theology, p. 563.

Glow-worm, Flying, cicindela volans. In the warmer months of the year, this creature is sometimes caught in our houses 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 fo, 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 shews. 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 sort of change which happens to caterpillars and other reptiles which become butterflies, and other species of winged insects. Moufett, and Thomas Bartholin, both describe the animal much as Aldrovand has done, but they allow the male only to have wings; but Julius Scaligier 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 Transactions, observed them in the same manner in the act of copulation both winged, and with no other difference between them but that the female was the larger of the two, which is the case in regard to many insects. Julius Scalig. Exerc. 191. Phil. Trans. N 167. p. 841.

The male and female in this winged state both shew in hot weather, and their light is so vivid as to be easily seen even 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 some 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. Moufett, 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, and 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
The native and its oblique flowers. 1785, a anthers 9. this mucli and enemies. Thomas Barthol. de Luce Anim. lib. ii. cap. 12.

This insect is of the beetle kind, of a brown and dirty colour. It has hard cape 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 fort of shield or broad-brimmed hat; under this hat are placed the eyes, which are black and large, and are moveable, so that the creature can, upon occasion, thrill them forward: it has two hairy antennas, and its legs are like those of the common fly, hard, sly, and hairy. Its eyes afford an elegant object for the microscope, being composed of an infinite number of lenses, as those of the libelle and other insects. Aldrovand. de Insect. lib. i. cap. 8.


Gen. Ch. Cal. Perianth superius, of five oblong, spreading, nearly equal leaves. Car. of one petal, obliquely bell-shaped; gibusious at the base: its border in five rounded obtuse lobes, the four uppermost recurved, the lower one prominent, concave and inflected. Stem. Filaments four, much shorter than the corolla, with the rudiment of a fifth; inferted into the receptacle, connected with the base of the corolla, incurved, downy, converging laterally in the upper part, two after the shortest: anthers ovate, pale, two-celled, cohering together, their lobes diverging. Pyl. Germen inferior, turbinate, furrowed: style cylindrical, as long as the flaments: stigma capitate. Peric. Capsule imperfectly two-celled, with two valves, and two lateral divided receptacles. Seed numeros.

Eff 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 with many seeds, inserted into lateral receptacles. 1. G. maculata. Curt. Mag. t. 1191. (Martynia perennis; Linn. Sp. Pl. 862. Hort. Cliss. t. 18. Ehret. Dict. t. 9. f. 2. Mart. Mill. Dict. v. 3.—Native of South America; the seeds having been sent from Carthagena by Mr. Robert Millar, before 1739. It requires with us the confiant heat of a dark flow, by means of which it flowers late in autumn. It is propagated abundantly by the little tuberous roots, which are perennial. The flamen herbaceous, fimple, leafy, round, very smooth, spotted with purple. Leaves large, opposite, recurved, filated, broad-ovate, acute, ferrated, smooth and shining, pale at the back, with prominent veins. Flowers axillaries from the diminished leaves, or bracées, at the upper part of the flamen, folicit. filated, large, drooping, of a fine blue with a dark spot at the bottom within. Their fcent is very peculiar, refumbling mint, which no writer seems to have noticed.

GLUBOKAYA, in Geography, a town of Ruffia, in the government of Kolyvan; 72 miles E. of Semipolatnoi.

GLUCHOV, or Glukhov, a town and district of Novgorod Severoff, situated on the river Yefma, falling into the Seim; 40 miles E.S.E. of Novgorod Severoff.

GLUCK, le Chevalier Christopher, in Biographe, a musical composer of great fire and originality, who, during the last 30 or 40 years of the preceding century, acquired great renown, but chiefly in France, by a species of composition, congenial to the national taste, which Lulli and Rameau had formed, and in which the short and simple airs required no great abilities in the fingers; but the dramas being written in the language and made being regarded as more important performance than the composer of the mufe, the several characters required great actors rather than great fingers.

This eminent composer was born in the Palatinate, of a poor family, about the year 1716. His father, during the infancy of his son, removed into Bohemia, where he died, leaving his offspring in early youth, without any provision, so that his education was totally neglected; but nature had given him an instinctive love for music, which he himself used to practice with the greatest skill and taste, by reason of his father's instruction in the second degree of singing, which he acquired with the greatest facility.

This was the ease with the young Christopher, who travelled about from town to town, supporting himself by his talents till he had worked his way to Vienna, where he entered the service of a nobleman, who became his patron, took him into his service, carried him into Italy, where he procured him leons in counterpoint, at Naples, by which he profited so well, that before he left Italy he composed several dramas for different theatres, which acquired him reputation sufficient to be recommended to lord Middlesex as a companion to his lyric theatre in the Haymarket, then under his lordship's direction. But, unhappily, arriving in England in 1745, after his first opera of "Artamene" had been performed ten nights, in which the famous air "Raffarena il mesto" sung by Montefilli, was constantly encored, the rebellion broke out, and the great Operabanche was shut up, on account of the popular prejudice against the performers, who, being foreigners, were chiefly Roman Catholics. Nor was the Opera-banche allowed to be opened again, till January 7th, 1746, when "la Caduta de Giganti," fet by Gluck, was performed before the duke of Cumberland, in compliment to whom the whole was written and composed. The fingers were Montecelli, Jozzi, and Ciacci; with figuro Inier, Pompeggi, afterwards better known by the name of madame Cornelle, and Frai. The first woman, Inier, never surpassed mediocrity in voice, fafe, or action; and the Pompeggi, though nominally second woman, had such a masculine and violent manner of singing, that few female symptoms were perceivable. The new dances by Auretti, and the charming Violette, afterwards Mrs. Garrick, were much more applauded than the faults, which, however, for the time, had considerable merit. The first air in G minor is of an original call, but monotonous. The second air's genius and excellency in it. Then a duet, in which he hazarded many new passages and effects. The following air, for Montecelli, is very original in symphony and accompaniments which a little disturbed the voice-part in performance, we well remember, and Montecelli called it oria tedeo. His contemporaries in Italy, at this time, fancied too much filed down; and when used afterwards in that country, made him one of the greatest composers of his time. The next air printed, is in a very peculiar manner,
fure, and like no other that we recollect: it has great merit of novelty and accomplishment; the voice-part wants only a little more grace and quiet. The following song, set for Jozzi, a good musician with little voice, is full of new and ingenious passages and effects; we should 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 Termeoegus, Galuppi, and Jomelli; and we heard little of him till he joined with the Italian poet Calzabigi, with whom he joined in a conspiracy against the poetry and music of the melo-drama then in vigour in Italy and all over Europe. It is extraordinary 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 most cordial praise of the works of the imperial laureate, should be the first, ten years after, to find them so defective; writing his "Orofello" in a different style, and joining with Gluck in doubly exciting the lyric 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 Vienna. 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, when an opera is performed in the language of the country, and the singers have not 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 the opera audience understands Italian, by abridging 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 1760 in London; when the principal parts were filled by Guadagni and Graffo, afterwards Mrs. Bach. The unity, simplicity, and new dramatic excellence, which 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 1765, Calzabigi and Gluck, encouraged by the successes of "Orfeo," produced "Alceste," a second opera, on the reformed 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 Millico 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 set to music an opera taken from Racine's "Iphigenie," 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 mistrust, and always jealousy, in his music; though set to French words, and for a facile French opera.

But the year 1774 was rendered a remarkable era 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 taste, were received with acclamation. He began his career in this capital by his celebrated opera of "Orphee," of which the reputation was already established; and this was followed by "Iphigenie," taken from one of Racine's best tragedies, which did all the successes 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 operas of "Cythere Alligée," 1775, where much delicacy and tenderness, than force, were required in the composition, he was not so successful. Nor was his "Alessandro," the year following, received with the same rapture as at Vienna. Indeed his "Armide," in 1777, did not quite fulfill 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 recitative was more rapid and the airs more marked, than in Lulli and Rameau; there were likewise more energy, fire, and variety of movement, in his airs in general, and infinitely more force and effect in his expression of grief, fear, 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 excited 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 so much 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 genius allowed to have great merit of a certain kind; but though there is much genuine and intrinsic worth in the dramatic compositions of this master, the congeniality of his style with that of their old national favourites, Lulli and Rameau, was no small merit 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; these and other encomiums preparatory to his apotheosis, were uttered and published in the journals and newspapers of Paris, accompanied with constant and most unmeaning encomiums of Italian music, with which specious, admiring, and humble names were added to the titles of his operas.

This admirable composer, the delight and pride of Naples, as Gluck of Vienna, had no sooner erected his triumphal arch in France, than all the friends of Italian music, of Rameau's doctrines, and of the plan, if not the language, of Metastasio's dramas, enlisted 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! estes vous Piccinni ou Gluckelet?" These disputes, and those of musical critics, and rival artists throughout the kingdom, seem to us to have flourished and diminished the pleasure arising from music in proportion as the art was advanced to perfection. When every paper or magazine in a new composition is to be analyzed and dissected during performance, all delight and enthusiasm
The chevalier 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 indeed, 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 conducive to France, where there were no good singers, and where no good singing was expected or underlived 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 Encyclopaedia 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 hasten to hail 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 interlacing as it is fertile."

Gluck, in a moment of frangible, over a bottle, said "the French are a very good sort of people, who love music, and want forg in their operas; but they have no fingers." And Sacchini, being asked how his operas were executed at Paris, said, "God forbid I should ever go to hear them performed!" And these are the people who are to furnish models of dramatic music to Italy, and to all the rest of Europe!

GLUCKSBURG, in Scania, a town of Denmark, with a fortress, in the duchy of Sleidw; nine miles E. of Flensburg.

GLUCKSTADT, a sea-port town of Germany, in the duchy 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 crofles 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 seat 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 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 1692 by permission of Christian IV. in a walle called the Wildenefs, and in the patent granted to it, he ordered that it should be called Gluckstadt, or the Fortune Town; he also conferred upon it many customs, rights and privileges, such as were enjoyed by the town of Willem; and it was soon after invested with the Lubeck and Hamburg rights. It is distant 28 miles N.W. from Hamburg. N. lat. 53° 51', E. long. 9° 20'.

GLUE, GLUTEN, a viscid, 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, globe glue, parchment glue: but the two last are more properly called false.

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 best is that made in England, in square pieces of a ruddy brown colour: Flanders glue, which is white 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; these being capable of being applied to better purposes: but they make use of the flaving, parings, or scabs of the hides, and also horns; and sometimes they make it of the feet, sinews, nerves, &c. of heads; and also of the pelts obtained from furriers.

That made of whole skins is the best: and that of sinews, &c. the worst: and hence, chiefly, arises the difference of glue, and the advantage of English and Flemish glues.

GLUE, method of making.--Mr. Clowes, in the Monthly Magazine for 1822, gives the following extract 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 stirring, and afterwards laid in a heap and the water pressed out. They are then boiled in a large brash cauldron with clean water, fumming 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 fumming is continued for some time, after which the mass is strained through badders, 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 fumming, till it becomes of a clear dark brownish colour. When it is thought to be strong 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 sort of wooden box open in three divisions to the back; in this the glue, while yet soft, is cut into three pieces, by an instrument like a bow, with a brads wire for its string. The pieces are then taken out into the open air, and dried on a kind of coarse net-work, fastened in moveable frames 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 retains 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 glue from bad glue, the purchaser should hold it between the 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 forged pieces, causing it to simmer for a quarter of an hour over a slow fire and frequently stirring 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 flint brush. In an interval from one
one to three days the pieces of wood will be so perfectly cemented, that boards, thus adhering, will as readily break in any part as separate at the junction. 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 considerableness degree of cold.

GLUE, Res. See WAX.

Glu, rift, 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 worship matter found on the skin 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.

Glu is of considerable use in medicines, and divers others arts; where it is better known under the name of sedgeglue and ichthromen. See Isinglass.

A strong and fine glue may be prepared with sedgeglue and spirit of wine thus; steep the isinglass for twenty-four hours in spirit of wine or common brandy. When the menstruum has opened and mollified the isinglass, it must be gently boiled together, and kept stirring 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 stopped.

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. 130.

A strong compound glue may be made by infusing a mixture of common glue, in small pieces, with isinglass 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 lambardae 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 isinglass and parchment glue, and having pounded them into small pieces, pour the solution of the gums upon them, and melt the 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 isinglass glue to two quarts of skimmed milk, and evaporating the mixture, a due consistency.

A glue, that will hold against fire and water, may be made by mixing a handful of quick-lime, with four ounces of linseed oil, boiling them to a good thickkness, 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 Buffy, in Botany, is the peculiar calyx of graffes and graff-like plants, and indeed their corolla, at least what is so termed by Linnaeus, is of the fame chaffy nature. Hulks or Glumes are usually comprized, embracing each other at the base: more rarely they are depressed, flattened vertically, as in Quaking-grafts or Briza. To the hulk belongs the arija or awn, (see ARISTA) which is a bristle-shaped appendage, usually spiral, and possessing the properties of an hygrometer. It originiates from the midrib or keel of the hulk, and is either terminal or dorsal, being in the latter case placed sometimes very far down the back of the hulk, in many species of Arvena, and in these instances it belongs to the glumes that constitute the corolla, not the calyx. The arija, though so remarkable, is by no means always confluent in the same species, though nearly invariably so in the flowers of the same individual plant.

Hulks are mostly furnished with one central longitudinal rib, though the inner glume of the corolla in graffes have two nearly marginal ones. They have in most instances, besides the central rib, a greater or lesser number of lateral ones, all likewise longitudinal, of great use in distinguishing species of Poa and other difficult generas. Their margin is commonly thin and more or less membranous or fragile. Some glumes always remain separate and distinct from the leaf which they commonly enfold; others are closely incorporated with that part as it ripens, of which a curious example may be seen in Briza.

Some sorts of viviparous graffes exemplify the transformation of glumes into leaves in a remarkable manner, the same remaining at the summit being perhaps the only indication of their original nature. See Aro Luscenta, Eng. Bot. t. 2102. 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 specimine of a similar change in the Arenaria alpina, part of whose 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 among with the seed, serving the purpose of a pericarpium.

GLUMACEOUS Flowers, a term applied by botanists to the flowers of the natural order of graffes, expressive of their chaffy nature.

GLUMMEN, in Geography, a town of Prussia, in the province of Natangen; 24 miles S. of Konigberg.

GLURANTZ, or GLUS, a town of the county of Tyrol, situated on the river Adige, built in 1562, and surrounded with walls in 1550. It was taken by the French in 1799; 36 miles W. of Brixen. N. lat. 46° 38'. E. long. 10° 26'.

GLUS, in Surgery, a species of dyuria, attended with a copious quantity of mucus in the bladder. Hence, the ma-

GLUT, among Falkmers, the fliny substance that lies in a hawk's pouch.

GLUT, in Rural Economy, a term sometimes provincially applied to a large wooden wedge.

GLUTA, in Botany, so called by Linnaeus, from the Latin word glatus, thrith 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 adflablatina, even in the generic character, as well as in his subsequent observations. Lin. Mant. 2. 160. Syll. Veg. Ed. 14. 821. Schreb. 146. Willd. Sp. Pl. v. 1. 1120. Mart. Mill. Dict. v. 2. Jussi. 427. Glaf and order, Pentandria Moneypia. (Linnaeus refers it to Gynandra Pentandria.) Nat. Ord. Capparidae. Juff.?

Gen. Ch. Cal. Perianth inferior, of one leaf. Membranous, bell-shaped, obtuse at the base, with a crown half way down into two lobes, deciduous. Cor. Petals five, equal, lanceolate, bluntish, somewhat oblique, four times the length of the calyx; their upper part spreading horizontally; their claws cohering round the flake of the germen, and attached to it. Stam. Filaments five, bell-shaped, rather shorter than the petals, inserted into the summit of the flake of the germen; anthers versatile, rather oblong. Pyt German, obovat.
G L U

Globate, standing on a cylindrical stalk, which is rather longer than the calyx; style thread-shaped, equal to the filaments; stigma simple, obtuse. Peric. and Secos unknown.

Eff. Ch. Calyx bell-shaped, cloven, deciduous. Petals five; their claws cohering round the stalk of the germen. Stamens inserted into the top of that stalk, below the germen.

1. G. Benghæs. Linn. Mant. 2. 293. Native of Java, where it is called Benghæs, and, if we mistake not, in the Malay language Dodec. This plant is unknown to all botanists except Linnaeus, by whose herbarium alone it can be determined. His remarks have led the students of natural orders wide of the truth concerning it, for nothing can be more unlike Puffflora. To Sterculia it has some resemblance, and we have been much inclined to refer it to Jullien's Malvocea, especially from its likeness in some respects to the Aflonia of that author and of Cavanneills; but on examination this likeness proves fallacious. The most probable place for it is amongst or near the Capparidáceae, but the fruit being unknown, leaves this matter in great doubt. After all, it may be thought to belong to some new order, which the students of natural arrangement are but too prone to make on every emergency, and the French in particular fond to think they threw their skill by their refinements 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 Gluta Benghæs appears to be a shrub or tree, with slightly pubescent branches and buds. Leaves scattered, most numerous about the ends of the branches, from three to ten inches long, elliptico-lanceolate, bluish, 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. Stipulas none. Flowers nearly the size of Clamatis Flammula, or, as Linnaeus says, of a cabbage blossom, in a corymbose panicle; 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 glutei muscles. See Artery.

GLUTEN, Animal, in Chemistry. See Animal Fibre and Blood.

GLUTEN, Vegetable, a substance resembling the former, and found in several vegetables. (See Vegetable Fibre.) Beccari first found that wheat-flour contained gluten in considerable quantity, and from this it is obtained by the following process. (Aikin's Dict.) "Moisten any quantity of wheat-flour with a little water, and knead it with the hand into a tough dough-like paste, then let a very flender 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 feacula or flour 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 drenching 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 flour. 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 greenfocus 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 fibrous prominences named the buttocks.

The glutæus magnus, or maximus, is grand fossier, illiac-faco-femoral, is a very broad, thick, and bulky muscle, composed of large fasiculi loosely connected together, and separated to a considerable depth by adipose and cellular substance, of an irregularly quadrilateral figure, and situated obliquely at the outer and back part of the hip. The rounded felling, which forms the outline of the buttock at its back-part, and the projection of which hides the termination of the large ilio-femur, is formed entirely by this muscle. Its external surface has the same degree of convexity as that of the buttock; the internal, which covers the tuberosity of the ischium, and the great trochanter, is proportionally concave. It arises, 1st. By short aponeurotic fibres, from about one inch of the posterior extremity of the crista ili, where the bone extends beyond the facrum, and from the neighbouring part of the immediately subjacent notch. At this origin an aponeurosis may be observed, continuous with that of the thigh, and of the vertebral muscles. 2dly. From the ligament connecting the posterior end of the iliac crista, to the back of the facrum; and here it is continuous with the tendinous origin of the latilius dorsi, longilius dorsi, and facro-lumbialis. 3dly. From the external margin of the facrum, near its lint foramen, from the tubercle at the side of the termination of the canal containing the medulla spinales, and from the articulation between the facrum and coccyx. 4thly. From the posterior surface of the coccyx. 5thly. From the surface of the great facro-facieous 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 glutæus 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 glutæus 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 every where else immediately subjacent to the integuments. The inner surface covers the ossinnationum, the facrum and coccyx, the origin of the vertebral muscles, the glutæus medius, the pyramidales, the gemini, the obturator internus, the quadratus femoris, the tuberocity of the
the ribs, the origins of the semitendinosus and biceps, the adductor magnus, the sciatic nerve, and the great trochanter. A large synovial membrane, placed between this muscle and the fact-named eminentia, favours their reciprocal motions. The cavity does not in general contain much fluid; and it sometimes shows internal folds.

The gluteus medius, le moyen felleur, illo-trochanterian, is a thick and broad muscle, flattened and triangular, partly covered by the preceding, but placed more at the side of the pelvis. It arises by very short aponeurotic fibres from the external surface of the os innominatum, immediately under the crista ili. running forwards to the front as far as the anterior superior spine, and backwards to the facro-sciatic notch: downwards it is bounded by the curved line, which marks the circumference of the gluteus minimus. Another origin of this muscle is from the facia lata, where that aponeurosis is fixed to the crista ili, and where it separates this muscle from the tenor vaginae. From this double origin the fibres all take their course: downwards, the anterior or shortest being at the same time directed obliquely backwards; the middle, which are longer, passing perpendicularly, and the posterior or longest, coming obliquely forwards. In this way they all converge to meet in a broad aponeurosis in the radiate fibres, beginning in the substance of the muscle, higher behind than before, and defending, as it receives the musculi fibres successively, to the great trochanter, to be fixed to the upper and anterior part of that eminence. Many of the anterior fibres are mixed with those of the gluteus minor; so that the two cannot be completely separated without dividing some of the muscular substance.

Its external surface is covered behind by the gluteus magnus, in front by the facia lata. The inner surface covers the gluteus minor, the gluteal artery, and the surface of the bone. Its front edge is in contact with the tenor vaginae; the posterior with the pyramidalis.

Gluteus minor, or minimus, le petit felleur, ilio-sciatic-trochanterian. This is the smallest of the three glutei, and covers the os innominatum by its whole inner surface, being equally covered on the outside by the preceding muscle. It is thick and flattened, and has a triangular figure. It arises from the surface of the os innominatum by very short aponeurotic fibres; beginning at the anterior superior spine, and following a curvilinear line, which extends from the latter proceeds to the facro-sciatic notch. From this line, of which the convexity is turned upwards, it covers the bone as far as the edge of the acetabulum. These musculi fibres all descend in a converging manner; the middle taking a perpendicular course, while the anterior are directed backwards, and the posterior forwards. They are all implanted in a broad radiated aponeurosis, which lies on the external surface of the muscle, except towards the front, where it is covered by a few fibres of the preceding muscle. This aponeurosis, as it descends, forms a strong tendon implanted immediately within the former, in the upper and anterior portion of the great trochanter. It has some connection to the capsular ligament of the hip; and a small synovial membrane is interposed between it and the trochanter. It is covered by the gluteus medius, and very slightly by the pyramidalis; it lies on the bone, on the capsular ligament of the hip, and the origin of the rectus cruris.

Actions produced by the glutaei. — The muscles, which we have just described, move the thigh and pelvis reciprocally on each other. Their action on the pelvis may be observed both in standing and walking. When we support the trunk in the erect attitude on both feet, the glutei magni fix the pelvis firmly behind, and counteract that tendency which the body naturally has to fall forwards. Hence the bulk and power of these very muscles in the human subject afford a clear proof that man was designed for the attitude on two feet; this gives to the human frame the buttocks, which are seen in no other animal, because man is the only biped among the mammalia. In the case now under consideration the glutaei magni are assisted by the femi-tendinosi, femi-semimembranosus, and biceps; and antagonized by the psoas and ilacus, which perform a force much inferior to that which opposes them behind, because they are aided by the weight of the trunk. When the pelvis has been bent forwards, the glutaei magni will rest it, and if the circumstances admitted of this part being carried backwards, the same muscle would produce that motion. The other two glutaei are not effectually concerned in the attitude of leaning on both feet, but they are the principal agents in supporting and balancing the trunk on one foot, by 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 procreation: the glutaeus magnus balances the pelvis while one leg is carried 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 one leg, the glutaeus magnus can rotate the pelvis on the thigh bone of its own side, so as to turn the lymphatics pubis towards the opposite side. When the glutaei move the thigh on the pelvis, the magnus restores 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 glutaei magni 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 Zooncity. See URUS Gaul.

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, and spent a great part of his life in the island of Sicily. He is principally known by his "Annales," 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 1118, interspersed with a number of theological, philosophical, and physical discourses. An edition of the "Annales" in Greek and Latin was given to the public by father Labbe, in 1660. The third part has been published separately by Meurinus, with a version and scholia. Several letters of Glycas have been published in different collections. He was undoubtedly a very learned man, and the correspondance which he maintained with the literati of his age shew that he stood in very high reputation. Moreri.

GLYCERIA, in Botany, from γυετις, fluid, the seeds being eaten in Germany, and called Mannseeds, on account of their sweet taste. Brown Prod. Nov. Holl. v. 1. 179. — Claws and order, Triandra. Gynae. Nat. Ord. Gramma. This new genus of grasses is founded by Mr. Brown on the Novi-glauses of Linnaeus, Post glauces, Sm. Pl. Brit. 95, with the following characters.

Glene (Calyx) of two valves, containing many flowers. Spiket cylindrical, awnless. Perianth (Corolla) headless, its valves of equal length. Scale under the germin solitary, fetid, like a half fluid. Stigmas double compound. Seed uncon-
unconnected, oblong, with a furrow at one side. Flowers somewhat panicked.

We cannot but apply to the property of separating the graviola from the flowers, as far as habit is concerned, but we are very certain that *Pseudiscus*, *maritimus*, *punctatus*, and *Rosa Brit. and Ceylonensis* of Linnaeus cannot fail to go along with it, though we fear the characters given by the vagabond writer above quoted will not be held to hold good in all, if any, of these. Perhaps the following definition of *Glycine*, formed on simple and obvious Linnaean principles, may be unexceptionable, as embracing them all, and preferring an analogy with genera already established.

Glycine, from *triplus*, *tour*, 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. Apios*. This indeed is the original, and perhaps the only true *Glycine*, the numerous affinities of species ranged under this genus, by recent writers, being very anomalous in fructification, especially those of New Holland, as will appear by Mr. Brown's definitions when the second part of his valuable work appears.—Linn. Gen. 374. Schreb. 495. Willd. Sp. Pl. v. 3. 1553. Mart. Mill. Dict. v. 2. Att. Hort. Kew. v. 3. 34. Juss. 357. Lamarck Illutr. t. 699. Garto. t. 154. Chas. and order, *Diosphyllum Decandria*. Nat. Ord. *Papilionaceae*, Linn. *Leguminosae*, Juss.

Gen. Ch. *Cal*. Perianth inferior, of one leaf, compreßed, two-angled; upper lip notched, obtuse; lower longer, three-angled, acute; its middle tooth longest. Cor. papilionaceous. Standard incurve heart-shaped, dilated at the apex, gibbous at the back, emarginate 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, precluding the standard upward by its obtuse and dilated extremity, *Stam. Filaments in two sets, (one simple, the other in nine divisions,) slightly separated at the top, revolute; anthers simple, *Pist.* Gernon-aped, style cylindrical, rolled spirally; stigma obtuse. *Peric. Legume oblong. Seeds kidney-shaped.*

Eff. Ch. Calyx two-angled. Stamens in distinct sets. Keel of the corolla forcing back the standard with its point.

Obs. *Glycine Apios* and *fruticosus* have a two-celled legume. *G. monocotis* is a singular instance of a separation of the sexes in flowers of this tribe.

This genus has accumulated from two species (*G. Apios* and *fruticosus*) in the Hortus Cliffortianus, nine in the second, fifteen in the fourteenth, and last edition of *Systema Vegetabilium*, and finally to forty-four in Willdenow. These now form a very heterogeneous affinities, and the New Holland ones constitute a distinct genus, the *Kamunda de Ventenat*, distinguished by its spontaneously reflexed standard, and legume of many cells. The whole requires a thorough revision. Some are of opinion that *G. Apios* is generically distinct from all the others, and if so, it should be most convenient, though this is one of the original species, to give it the generic name of *Apios*, 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

...schreiben...
GLYCINE.

Suspended and exposed by an extent of surface to the action of the alkalies. If the treatment described is properly conducted, the fused mass, when softened with water, will be entirely dissolved by muriatic acid, and while it is being distilled, the muriatic solution thus procured must be evaporated in a still. A large quantity of water will dissolve the soluble salts, and leave the principal part of the fixed, which is to be separated and well washed on a filter. The filtered solution is to be precipitated by carbont of potash. The precipitate, consisting principally of alum, is to be dissolved in dilute sulphuric, and precipitated to the proper conclusion to afford crystals of alun. If the precipitate produced by carbont of potash has been well washed, it is necessary to add a little potash to the sulphuric solution. When the solution, on a second or third evaporation, and addition of potash, ceases to yield any more crystals of alun, the mother liquor is to be mixed with a solution of carbont of ammonia, greatly exceeding the quantity necessary to saturate the acid, and to be transferred to a bottle having a ground flintle: the mixture is to be well agitated, and carbont of ammonia is to be added till the precipitate which first appears is redissolved, or no longer diminished by fresh portions of the carbont of alum. The solution of the triple compound of glycine carbonic acid and ammonia is to be filtered in order to separate the small remaining quantity of alumine, and then boiled till the vapour cæases to change the colour of turmeric paper, or till it no longer has a ammoniacal smell; when all the carbont of ammonia being drive off, the whole of the glycine will be found precipitated in the form of a white granular powder, combined with carbonic acid. This powder is to be washed in a filter, till the water ceases to afford a precipitate with muriatic barytes and lime-water; it is then to be dried, and heated to redness: by this means, the water and carbonic acid, amounting to about half the weight of the whole, will be expelled, and the glycine, if it does not effervesc with acids, will be left in a perfectly pure state.

Glycine thus procured, is a snow-white powder, soft and somewhat unctuous between the fingers, very adhesive to the tongue, and deliquescent both of smell and taste. Its specific gravity is 2.976. It produces no change in the colour of vegetable blues. Neither oxygen nor nitrogen has any action on it, nor does it suffer any change by exposure to the atmosphere; as carbonic acid and moisture do not appear to be absorbed by it. It forms, with a small quantity of water, a slightly dulce paste, that possesss much less tenacity than that of alumine. Glycine has not yet been fused; it neither contracts nor hardens when heated, nor is it altered by exposure to the most intense fire. With borax it forms a white transparent glass, which does not become opaque on cooling. It refutes to combine directly with sulphur or phosphorus, but it appears from Fourcroy that a fulphat may be formed by decomposing the fulphat of glycine by charcoal. Glycine is soluble in a saturated solution of fulphurat hydrogen. A hydro-sulphat of this earth, it is likewise said, may be obtained by dissolving the fulphat in water. In these properties it approaches the alkaline earths, and constitutes apparently the link of union between them and the clafs to which it belongs. It is dissolved by both the fixed alkalies in their liquid state, but in a less degree than alumine, and, like alumine, is not taken up by ammonia. It is dissolved in a solution of carbont of ammonia, as has already been mentioned. It very readily unites with acids. All its soluble salts produce, when first titrated, the sensation of sweetness, which gradually becomes astringent.

In relation to its affinity for acids, glycine appears to be intermediate between alumine and magnesia, for it decomposes only the salts of alumine, yttria, and zirconium. 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, antimonious, muriatic, phosphoric, fluoric, boric, and carbonic following. No experiments have been undertaken yet, to ascertain what combinations glycine is capable of forming with the earths and metallic oxydes.

Yttria 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 distinct, and fully demonstrative of its peculiar nature. Glycine is similar to alumine, in being soluble in caustic solutions of the fixed alkalies, and in some of its physical qualities; but it differs from alumine in affording with acids sweet astringent salts in not yielding alum with sulphuric acid and potash; in possessing a greater affinity for acids; in being entirely soluble in carbont of ammonia; and lastly, in not being precipitated from its solutions by oxalate, tartrate, or prussiate of potash. It is to be distinguished from yttria, by its greater solubility in carbont of ammonia, the latter requiring for its solution five times as much carbonated alkali as glycine, by its salts occasioning a precipitate, when added to any of the succinates, by the insolubility of yttria in fixed alkaline solutions, and by the precipitate which the salts of yttria afford with prussiate of potash.

Glycine was considered as a simple body till the important discoveries of Mr. Davy gave rise to 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 both on such a supposition. This gentleman negatively electrified glycine, slightly moistened in contact with an amalgam of potassium, under naphtha, by a battery of 500 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 glucine for the name of the metal of glycine, when its existence is no longer doubtful.

Carbonat of glycine, as well as all the other salts of this earth, has not yet been discovered ready formed in nature. It is procured by precipitating the sulphat, nitrat, or muriat of glycine, by either of the carbonated fixed alkalies. The precipitate, which is the salt fought after, being well washed and dried, appears in the form of soft white powder, having a greasy feel and great lightness. Carbonat 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: moli probably all the alkaline earths deprive it of carbonic acid in the moist way. According to Klaproth it is composed of

| Glycine | 53 |
| Carbonic acid and water | 47 |

Phosphat of Glycine.—Phosphat of soda, added to a neutral solution of nitrat of glycine, throws down this salt either in a white pelluculent form, or in a mucilaginous state. It is insoluble in water, inpho and uneryllizable. 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 dissolve this kalt, and
and afterwards decompose it. Muratic acid produces a
similar effect, but in a less degree. It is likewise readily
decomposed by the carbonated alkalies and by all the car-
bonated earths, except carbonat of magnesia. With the sul-
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, dissolves very readily in dilute sulphuric acid.
The solution by spontaneous evaporation affords octahedral crys-
tals, 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 fyruppy con-
finence. Sulphat of glycine, has a remarkable sweet and astringent taste. It is very soluble in water. Heated,
it intumesces, suffers the watery fusion, and becomes pul-
vorous when it leaves of its water. It is completely de-
composed by a strong red heat, the acid being expelled and
the earth left in its pure state. It has been already ob-
erved that sulphat of glycine is converted, when heated with
charcoal, into a sulphuret; but this sulphuret, according to
Fourcroy, does not become a pyrophorus, like alum
thus treated, though sulphat of potash be present. A solu-
tion of nut-galls, added to this salt dissolved in water, pro-
duces 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 sulphat of potash, forms minute crys-
talline grains, which divide with ease in seven or eight times
their weight of cold water. Glycine, added to a solu-
tion 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 alkalies and earths, ex-
cepting alumine, yttria, zircon, and felines.

**Nitrat of glycine** is procured by faturating nitric acid
with glycine. The solution of this salt does not afford crys-
talline by evaporation, but produces a duftile and adhesive
mafs, which, when further dried, falls into powder. It
is very soluble in water and deliquescent in the air. It attrac-
ts moisture strongly, that it might, if easily procured, be ad-
antageously employed for abhorbing the hygrometrical
water of gases. Its taste is saccharine and astringent.
Tincture 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 sulphuric acid,
and by the same alkalies and earths as the sulphat.

The proportions of its component parts are not known; but
Vauquelin has observed that a given quantity of nitric acid
requires rather more glycine than alumine for its complete
furation; yet the former earth, though in combination with
nitric acid more soluble than the latter, decomposes with
the affilience 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, according to careful management
small crystals, the form of which, on account of their fine,
have not yet been determined; and in not being subject 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 fl, the
acid flies off, and leaves the earth in a flake of purity. It
is also decomposed when heated with phosphoric acid. The
fame effect is produced by sulphuric and nitric acids, and
by the alkalies, and by all the earths that decompose the nitrat.

**Acetat 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 glutinous
confidence, and the salt becomes brittle as it flowly

dries.

**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
salts, 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 salts gave rise to the hope
that these combinations might produce salutary effects on
the animal fytem. If his expectations should be realized, we
must agree with Vauquelin, that these salts will be some of
the most agreeable medicines that exist. Ann. de Chem.
part. i. 1808. p. 352.

**GLYCONIAN, GLYCONUS.** in Greek and Latin
poetry.

A Glyconian verse is that consisting of two feet and a
yllable; at least this is Scaliger's opinion; who adds, that
the Glyconian verse was also called the Euripidean verse.
See VERSE.

Others hold, that the Glyconian verse consist of three
feet, a spondee and two dactyls; or rather a spondee, cho-
riambus, and an iambus or pyrrhic: which opinion is the
most followed.

"Sic te diva potens Cypris," is a Glyconian verse.

**GLYCOSRRHIZA, in Botany, Liquorice, Glycyrrhiza
of Dioscorides, who describes the plant very faithfully and
accurately; but it is remarkable that he lays the flower is
like a hyacinth which can allude to the colour only, whether
his χιονίς δές; be the Delphinium or Hybridius of modern
botanists. The word is composed of γλυκός, sweet, and χιος,
a root; and the name in apothecaries' Latin, liquiritia,

as well as the English one, liquorice, the French 
 OVERRIDE, the Italian regolada, &c. with all their corruptions, originate
t. 215. Germn. t. 148.—Chas and order, Dianella Dem-

Gen. Ch. Col. Perianthus inferior, of one leaf, tubular,
two-hipped, permanent; upper lip in three deep segments,
of which the lateral ones are linear, the central one broad-
cle and cloven; lower perfectly simple, linear. Cor.
papillosous. Standard ovato-lanceolate, bright, longoval. 
Wings oblong, very like the keel, but rather larger. Keel of
two petals, acute, its claw the length of the calyx. Stam.
Fila-
ments in two feet, (one simple, the other in nine divisions).
Flag. German shorter than the calyx; style awl-shaped, as long as the flaments;
 stigma obtuse, ascending. Petio. Legume ovate or oblong,
compressed, acute, of one cell. Seed very few, kidney-
haped.
GLYCYRRHIZA.

Eff. Ch. Calyx with two lips; the upper three-crested; lower simple. Stamens in different sets. Legume ovate, compressed, of one cell. Seeds one or two.

1. G. ellenbana. Linn. Sp. Pl. 1045. "Native of Italy, as well as of Tartary and the confines of China; also abundantly, according to Dr. Sibthorpe, on the sandy shores of Crete, Samos, and Greek islands, where it still retains its ancient name unchanged. The long plant perennial roots, deeply defending into the ground in a favourable soil, are cultivated for their sweet taste and pectoral virtues, and are sufficiently well known. The stems are two or three feet high, nearly simple, leafy, round and fruticated. Leaves of several pair of equal, elliptical, entire, acute leaves, the odd one on a little stalk only like the rest, not on an elongation of the main stalk. Stipulas lanceolate, acute. Flowers several, in axillary, solitary, flattened heads; their colour a dull purple. Legumes clothed, in their upper part especially, with numerous long rigid prickles, resembling the fruit of Xanthium strumarium. Dioecious differs them to that of the Plane-tree. The whole herb is delicate of substance, but somewhat clammy to the touch.

2. G. fetida. Desfont. Atlant. v. 2. 170. t. 159.—Legumes prickly. Flowers spiked. Stipulas lanceolate. Leaflets sessile beneath; the terminal one nearly so. Found by Derfontaine on mount Atlas, and in cultivated fields near Maimene in Africa. We have it from Aixfar. Whole plant extremely fragrant. Leaves much like the leaf in size and shape, but the flowers are pale yellow, in long spikes. Legumes crowned with the permanent style, which is longer in this than in the former. The film as well as both sides of the leaves, is besprinkled with minute scales.


5. G. gurneana. Linn. Suppl. 330. Pallas. Reis. v. 3. t. G. g. 1. t. 1. 2. (G. labrida; ibid. 754.)—Legumes smooth, beaded. Flowers spiked. Stipulas lanceolate. Leaflets rounded, prickly beneath. Stem and stalks prickly.—Found by professor Pallas in sandy ground between the river Wolga and the Taman. Pallas MSS. The root is extremely sweet, especially in the spring. Stems usually two, rarely three, ascending, a fain high, nearly square, leafy, rough with numerous little rigid prominent prickles, as are the isoetals, and backs of the isofets. The latter are roundish or ovalish, obtuse with a little point, from and very above. Flowers longish, pale violet, with whitish wings and keel, in one or two thicks spikes about the top of each stem. The isofets 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 Glycyrhriza, flowers of an Ageratum, and fruit apparently of a Coriandrum; nor does the calyx answer to the generic character, being five-crested.

6. G. leucophaea. Linn. Sp. Pl. 1054. (G. orientalis, filisquis lariscifolius; Tourn. Cor 26.)—Legumes hairy. Leaves oblong-lanceolate, the terminal one on a long stalk. Flowers spiked. Found by Tournefort in the Levant. Root perennial. Of this we have seen neither a specimen, nor any further description.

GLYCYRRHIZA, in Gendier, furnishes 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 remain long unremoved.

Method of Culture.—A light sandy soil is the most adapted to the growth of this fort of crop, as its goodness consists in the length of the roots. The ground in which it is intended to be planted should be well dug and trenched 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 keep the roots from running down, and being properly supported, and immediately before planting it should be well dug again to the depth of three fingers, 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 sound.

The operation of planting them should be performed about the middle of March, which is done in this manner: a line is first laid across the ground, then, with a long dibble made at purpose, the shoots 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 shoots may be sown over the land. These must be kept perfectly clean by the hoe, care being taken not to cut off the top shoots of the liquorice plants, as it would greatly injure them. All the shoots which grow near the heads of the liquorice should also be removed. In October, the shoots 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 face operations must be annually performed, so as to keep the ground and plants in perfect order.

These plants will remain three years from the time of planting, when they will be fit to take up for use, which should be done when the shoots 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 shoots taken from the old roots cut into sets 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

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the ground afterwards quite clean by hoeing and other proper means.

The liquorice is a native of the south of Europe, but it has been cultivated in Britain ever since the time of Turner. (See Tourn. Herb. p. 2. fol. 12. published in 1562.) The chief places in which it has been long propagated for sale are, Pontefract, in Yorkshire; Workhop, in Nottinghamshire; and Godalming, in Surrey; but it is now planted by many gardeners in the vicinity of London, who supply the metropolis with the roots.

GLYCIRRhiza, in the Materia Medica. The root of the common liquorice, boiled slightly in a little water, gives out nearly all its sweetness. The decoction, pressed through a drainer, and infused with a gentle heat, till it will no longer stick to the fingers, affords a better extract than that brought from abroad, and particularly from Spain, whence our shops are chiefly supplied with it, and its quantity amounts to near half the weight of the root. The extract that is prepared here, is made by macerating, for four hours, liquorice root sliced, a pound, in a gallon of boiling water; then boiling down to four pints, skimming off the hot liquor, and evaporating it to a proper consistence. A purer extract may be made by a repetition of the process of solution and evaporation; and it is kept in the shops under the name of "refined liquorice." Rectified spirit takes up the sweet matter of the liquorice equally with water; and as it dissolves much less of the inebriating mucilaginous substance of the root, the spirituous infusions and extracts are proportionably sweeter than the water. This root contains a great quantity of saccharine matter, leaves disposed to run into fermentation than that of other vegetables, which is joined with some proportion of mucilage, and hence has a virulent sweet taste. From the time of Theophrastus it has been a received opinion that it very powerfully extinguishes thirst; accordingly it was named \textit{adiabatic}, and the root directed to be chewed in dropsies and other disorders where great thirst prevailed. If this fact be true, it is the more remarkable, as sweet substances in general have a contrary effect. Accordingly Dr. Cullen observes, that the sweet of liquorice, separated from the root, does not quench thirst more than other sweets: and he observes the error respecting it to this circumstance, that if a piece of the root is chewed till the whole of the sweetness is extracted, farther chewing brings out the acrid and bitterish matter, which stimulates the mouth and faints, so as to produce an excretion of fluid, and thereby takes off the thirst which the sweetnees had produced. Liquorice is in common use as a pectoral or emollient in catarrhal defluxions on the breast, coughs, hoarseness, &c. Infusions or extracts from it afford likewise very commodious vehicles for the exhibition of other medicines. Lewis's M.M. Cullen M.M. Woody, Med. Bot.

GLYMN, in Geography, a county in the lower district of Georgia, in the United States, bounded E. by the ocean, N. by Atlantic, which separates it from Liberty county, and S. by Camden county. It contains 1734 inhabitants, including 1052 slaves. Its chief town is Brunswick.

GLYPH, in Architecture or Sculpture, is any canal or cavity used as an ornament. The Greek word is \textit{πλυς}, which literally signifies growing, incising. Treba is properly a notch or indenture made in graving; or, more properly, it is the notch in the end of an arrow, in which the string goes.

GLYPHTIC ART, the art of engraving precious stones. See Gems.

GLYSTER. See GLYSTER.

GEMIN, JOHN GEORGE, in Biography, 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, whether some of his teachers had been invited. Here he gained many favours from Blumentoell, 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 commissary formed by the Russian government, for the purpose of exploring the boundaries of Siberia; and set out on the 15th of August, with G. F. Muller, and Louis de L'isle de la Croyere, and a party of twenty-eight persons, consisting of draughtsmen, masons, hunters, land surveyors, and twelve soldiers, with a surgeon and drummer. In the month of February, 1741, 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 Baehmeiter, while on a visit to Tubingen. He died of a fever in May, 1755, in the forty-sixth 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 Siberiarum," 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 1745, Göttingen, 1751, 1752, in four parts, 8vo. with plates. Gen. Biog.

GEMLIN, SAMUEL GOTTLIEB, son of Philip Frederick Gmelin, was born at Tubingen in 1743; where he obtained both his scholastic and academical education, and graduated M. D. in 1765. 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 Guldenstadt, to explore the province of Afiacman, at the time that the transit of Venus over the sun's disk was expected, and set out in June, 1768. Having examined the countries on the western side of the Don, the Persian provinces on the south and south-west side of the Caspian sea, the banks of the Volga, 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 chief of Chaitaks; 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 emperors gave orders that he should be refuted by force; but this was rendered impossible at that time by the rebellion of Pugalchef; 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. "Reichen nach 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 Tcherkass, in the years 1768 and 1769. Petersburg 1771 with thirty-two plates. Part II. Journey from Tcherkass to Alfracan, from August 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. edited after the author's death, by professor Pallias. Journey from Alfracan to Czarizyn: 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.

Gmelina A., in Botany, received its name from Linnaeus, in honour of John George Gmelin, a native of Turbingen, 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. Hallay 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 same 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 which died in 1764, aged 31.


Gen. Ch. Cal. Peraianth very small, inferior, of one leaf, nearly globular, with four small unequal teeth, permanent. Cor. of one petal, ringent, inflated; its limb four-cleft; the upper segment large and vaulted; lower, and lateral ones, smaller, oblong, rounded, spreading. Stam. Filaments four; the two uppermost thicker and shorter; two lowermost curled upwards; anthers two-lobed; two of them sometimes smaller and simple. Pfl. German superior, roundish or obvate; style as long as the longer filament, attenuated; stigma acute. Peric. Drupa ovate, of one cell. Nut obvate, smooth, of three cells, the lowermost abortive. End. solitarious.


1. G. spicata. Linn. Sp. Pl. 873. Burm. Ind. v. 132. (Jambhato sylvestris parvifolia; Rumph. Anth. v. 1. 139. t. 40.)—Leaves roundish, somewhat three-lobed, acute, downy beneath.—Native of Java, Amboina, and other parts of the East Indies. A tree, with straight, roundish, slightly downy branches. Leaves opposite, scarcely two inches long, of a roundish or elliptical form, acute, or sometimes furnished with a short broad lobe at each side, entire; smooth above; pale and downy beneath; the midrib bearing off two principal lateral ones, that above its base, and ve
eral smaller ones higher up, all which are branched. Feet. flanks downy, various in length, often nearly equal to the leaf, each with a small hairy bud above its infection, and above that usually a straight, downy, horizontal sipe. Flowers in a short, simple, downy, terminal racemus. Calyx downy, besprinkled with several large, shield-like, smooth glands. Corolla large, yellow.

Rumphius's figure unquestionably belongs to this plant, but his description seems that of an Eugenia. Plukkenet's t. 305. f. 5. is certainly Gardenia dulcamora, and refurnishes our Gmelina only in being thorny; his t. 97. f. 2. may possibly be intended for Gmelina parvifolia, but is of no use as to determining it.

2. G. elliptica.—Leaves elliptical, undivided, obdome, downy beneath. Thorns none.—Native, we presume, of the East Indies, confounded in the Linnean 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 glandular 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; Burm. Ind. 132.)—Leaves obovate, undivided or three-lobed, smooth on both sides. Common in every forest and uncultivated place on the coast of Coromandel, flowering in October and November. Roxb. It is often intermixed with G. equita, from which it differs in its more humble size, larger and constant 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, thick 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 gonorrhœa. Water thickened with branches and leaves of Pedulium Murus 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 Stichin guoomadeo. It may possibly be Plukkenet's Lyriticus Madrastifastum, t. 97 f. 2. as Burman takes it to be, but Sloane's Rhamnus, Hist. 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. arboria. Roxb. MSS. (Cumbula; Rheede Hort. Mal. v. 1. 75 t. 41.)—Leaves heart-shaped, undivided, pointed, downy beneath; their lateral ribs cloven. Thorns none.—Grows from the coast of Coromandel by the Rev. Dr. Rottler, with the above name of Dr. Roxburgh. Gartner has most fully pointed out the Cumbula of Rheede 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, flaked, 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. Burm. Ind. 132 t. 39 f. 5. (Dory Zakia of the Malays.) Leaves alternate, heart-shaped, crenate, smooth on both sides.—Native of Java. Herb. Linn. A shrub or tree, with round, somewhat zig-zag, slightly downy branches. Leaves from half an inch to an inch long, alternate, on short hairy stalks, veiny, bluntly crenate. Thorns 3 c 2 straight.
straight, slender, acute, mostly longer than the leaves. The flowers and fruct are known. We have only
Burnian's very feeble authority for making this a *Gnidia*,
which its alternate crinate leaves strongly disencourage,
but did Linnaeus ever venture to adopt it? S.

GMUND, in Geonaphy. See GEMUNDEN.

GNA, a town of the duchy of Styria; 24 miles S.E.
of Graz.

GNADENHUETTEN, a settlement of the Moravi-
as in America, situated on Multhiingam river, opposite to
Salem, in the lands which belonged to the Mahican Indians.
—Also, the name of a Moravian settlement, on the S.W.
bank of Lehigh river, in Pennsylvania, about 25 miles N.W.
of Bethlehem.—Also, a Moravian Settlement, called Acca
Gnaadhuettten, on Huron river, about 22 miles from lake St.
Clair, in the county of Wayne, and 28 N.W. of Detroit.

GNAPEZI, a town of Birmah, on the Irawaddy;
sometimes called from Gaape, or Napes, a fort of soap, half
picked and half putrid, used as a dye by the Birman,
and forming an extensive branch of trade: 116 miles N.N.W.
of Rangoon.

GNAPHALIUM, in Botany, γνάφαλιον, an ancient Greek
name, from γνάφαλος, soft down or seed, such as is plucked
from both in forming it, alluding to the woolliness of
the herbage. Many writers have contended that *Santolina mari-
tina* of Linnaeus, and *Sm. Fl. Brit. 869*, is the true * gland-
as* of Dioscorides, an opinion extremely difficult to esta-
lish or to contradict, as all he says of it is, that *its leaves
are white and soft, useful for stuffing.* However this may
be, Tournefort, and lately Gartner, 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 some species have of
late been separated. See *Eichhorn—Card-weed.*—Linm.
*Sm. Fl. Brit. 867*. Jaff. 1759. (Eichhorn; Garn. t. 166.
Antennaria; Garn. t. 165. Anacoton; Garn. t. 165. Fili-
Guergiu. Garn. t. 166. See Filiagn.) Claff and order,
*Sygoepalio Polygammia*; *Garn*., Nat. Ord. Compositae Noce-
montes, Linm. *Corymbiura, Juff.*

Gen. Ch. Comun calyx imbricated, rounded; scales
numerous, the marginal ones rounded, scariofe, coloured.
Cor. 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. Stam. (in the perfect flowers) Filaments five,
very short, capillary; anthers forming a cylinder. Pist. (in
the same flowers) German ovate; style thread-shaped, the
length of the filaments; stigma cloven. In the female ones
the same. Peric. now, except the permanent disodium
(style) German ovate; style thread-shaped, the length of the
filaments; stigma cloven. In the female ones the same.
Peric. now, except the permanent disodium
(style) German ovate; style thread-shaped, the length of the
filaments; stigma cloven. In the female ones the same.
taceous); the plantain-leaved everlasting (G. plantagineum); the common shrubby everlasting, or Ichecas. (G. oxechas). Many of these are curious plants.

Method of Cultures. — 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, and then in the open air when the weather is settled without water. When they have taken full root, they may be removed into separate pots, and be placed among other plants of the garden. They require the protection of a frame in the winter season.

The fifth species may be increased in the same manner, being placed at once where it is to remain, in a shady sheltered place, or other place that is proper. The fifth and sixth sorts may be easily raised by dividing and planting their creeping roots where they are to grow, either in the autumn or spring months.

These three last are sufficiently hardy to stand the open air in warm situations.

They are all ornamental plants, the former in the greenhouse collection, and the latter in the open ground.

GNAPHEUS, in Entomology, a name given by Authorities and others of the Greek writers to the tench.

GNARP, in Geography, a town of Sweden, in the province of Helsingland; 20 miles N. of Hudwrickov.

GNAT, in Entomology. 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 gnat. Others indeed give us more pain with their stings, but it is but by accident that we are struck by them; the gnats thirst for our blood, and follow us about in the open air for us. There are many marshy places where the legs and arms of the motto 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 trouble-some 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 bestowed this many very observable particulars in the course of their lives.

All the naturalists of late years have applied the microscope to the examination of the parts of this little animal, and it is a production of the Hook, Bonnami, Leeuwinkoek, &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 some are considerably large, yet none of these approaches to the size of the tipula, or father long-legs, as commonly called. The larger tipulae are therefore easily distinguished from the gnats; but Swammerdam, Goedart, Lister, and others, have very often given us the smaller tipula among the species of gnats. Both have long slender bodies, and both prominent corselets, which make them look lump-backed; but when either of the kor insects are 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 Upsinifer in Essex; but of those of a size to be remarked with ease, 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 treated 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 first species; the third kind is the smallest of the three and the most common, has its corselet red, or of a faded reddish yellow, and the body whiteness, and on the under part of the belly every ring has one single brown spot; the rest is grey; the eyes of this species are of a very pleasant green.

All the gnats have a long cylindrical body composed of eight rings; their corselet is short but large, in proportion to the size of the fly, and to this are fixed the fix legs, which are hairy, with fix joints to each, and at the end two little claws, the wings, and the balances: four fixstomata are also found here, as is the case in other flies; the two fixst 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 bristl-horned or male gnat has two pairs, one of which is surrounded, at small distances, with long hair, passing out circularly, each circle forming a series of the extremity of the antenna; the other pair are longer and much thicker, and hairy from end to end. In the great hellied or female gnat, the first pair of antennae, though of the same figure as the male's, has hairs not near to long, and the second pair is shorter than the first by at least three parts in four.


GNATS, Eggs of See Eiga.

For the Eggs of Gnats, see Eggs 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 hatching to the bottom of the water, form for themselves coverings of fine sand or earth, cemented together with a spot of glue, but open at both ends, that they may come out and enter as occasion requires.

These worms do not frequent rivers; 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 watery and marshy places are found most to abound with gnats, and why the wet fummer's 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 vellcy 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 bottom of their body, above water. The end of this pipe is hollowed 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 list of the worms from whence they are produced; and to this is 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 views in which those druggists 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 passes within it; it is at any time easy to see into the memoir of the intellines, by which the food is pushed on towards the anus. The two principal tracheae 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 is as easily thrown off as in the rest, 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 applied to the under part 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 swims about as swiftly as when in its other state.

When the creatures have quittd their first habitations and the figure of worms, they recede 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 brist of hair at the end of it, which, being smeared 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 sink 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 gnat 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 nymphal state; but after some time is accomplished, its change into a gnat 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.


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 Mineralogy, 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 disposed in such a manner as to exhibit a more or less flatly structure. This structure passes through various degrees of distinctness; on one hand it approaches to near the granular texture, that the distinction between gneifs and granite ceases to exist, while, on the other hand, when its peculiar texture is very obvious, and becomes what is termed thin flatly, a pallage is formed into the primitive rock, next to it in antiquity, called micacr-flate. In its progress towards the nature of 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 predominant, owing to the circumstance, that on breaking a mass of gneifs, 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 the first, will, in this case, soon deceive the observer. Though feldspar, generally speaking, the predominant ingredient of gneifs, yet the proportion of mica in this rock is, upon the whole, greater than what we see it in granite: and if this is the case, the more the maa appears granular, and the more it approaches to granite. It is often a matter of difficulty, in viewing small specimens only, to distinguish some kinds of gneifs 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 observer.

Gneifs, viewed in the large, as a mountain mafs, 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 gneifs, viz. that approaching the granular structure, the waved or undulated, the common, and the thin flaty gneifs. As particular varieties of these, 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-Newhonberg, Reilland and Hartmannsdorf, near the Bohemian frontier. 2. The sprinkled, or that kind of gneifs in which the feldspar and mica exhibit themselves in the form of small neifs; such as that found at Hartmannsdorf and Bobrith, near Freiburg, and at Kuffenberg in Bohemia. 3. The short lamellar or flaky variety, as it is found at Marienberg.

The colour of the ingredients of gneifs is not subject to great variation. The feldspar is generally of a greyish, yellowish, and reddish-white colour, feldom yellowish-grey, or deep fells-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 feldspar appears fioke-grey or brown. The colour of the mica is generally black or brownish-black, sometimes brownish, yellowish, and ash-grey, and rarely silver-white or of a golden hue.

These component parts are found to vary also in regard to their freshness: in general the feldspar is perfectly foliated and shining; but sometimes it appears in incipient decomposition, or even converted into petzime; in the same manner as the mica is now and then seen passing into a greenish substance resembling flake. Dr. Reuuf found that the porceain earth dust at the Galgenberg, near Puchwiszitz, in the Saatz district of Bohemia, where it is used for white- washing walls, is the result of the highest stage of decomposition of gneifs; it forms thick strata, and contains a great quantity of small greyish 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 gneifs into a ferruginous clayey mass. Near Klostery it is seen converted into bunt-iron or variegated clay.

Besides the more essential feldspar, quartz, and mica, the following accidental ingredients are now and then met with in gneifs. 1. Sylor: both the common and black tourmaline sylor, sometimes occur in the gneifs of Freiburg, and particularly of Spain. 2. Garnet; rarely, but much more frequently than in granite; it occurs at Wielenthal-in Saxony, in Norway, in the island of Zealand, in Morocco, &c.
GNEISS is but seldom found, and only in the thin flatly variety of gneisfs, which pass into mica and hornblende slate. 4. Steatite: occurs principally in the gneisfs forming the walls of the metallasiferous 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 gneisfs in Switzerland and Hungary. Metallic substances that are sometimes found disseminated in gneisfs, in the vicinity of veins, cannot properly be enumerated even as accidental component parts of this rock.

Gneisfs abound in metals more than any other rock, as may be seen from the richness of the Saxon and Bohemian mines, those of Saltburg, &c. There are but few among the known metals that are not found in it, either in veins or beds.

"The oldest gneisfs in the Saxon Ertzgebirge," says Mr. Jameison, "that with reddish-coloured feldspar, is the least productive in ores; but the newer, with white coloured feldspar, is the most productive; and the veins, though small, are numerous. The oldest venigerous formation appears to be that which contains titan-foce. The titan-foce is accompanied with wolfram, molybdenum, arsenic-pyrites, fluorspar, chlorite, topaze, and opal. The second venigerous formation appears to be a lead-glance formation. The third formation consists 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 cobalt. The fifth formation is that which contains ores of silver. Veins containing antimony, and red iron-foce occur in gneisfs, and these are supposed to be newer than any of the preceding. The metallasiferous 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 subordinate to, and synchronous with, gneisfs, and which are therefore not seen in granite, viz. granular limestone as it is observed; for instance, near Freiberg; primitive trap, such as hornblende-slate, at Kutenberg in Bohemia, at Kongberg in Norway, &c; and the older porphyry. (See LIMESTONE, TRAP, AND PORPHYRY.) Also small beds of common gargets, actinote, with magnetic iron-foce, iron-pyrites, galena, &c. now and then occur in gneisfs.

Gneisfs 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 gneisfs, and on the whole it may be said that the nearer it approaches in its texture to Mica-foce, (see that article,) the more recent is its origin. From this does it not, however, follow, that there should not be found kinds of gneisfs which forage in antiquity even some kinds of real granite. (See GRANITE.) The very thick flaky varieties of gneisfs, with black mica and a small proportion of mica, may, in general, be said to be of more ancient formation.

Gneisfs, though far less widely distributed than granite, has still a considerable range; it extends over the greatest part of the Saxon Ertzgebirge: the country about Freiberg, Glaubitz, Marienberg, Ehrenfriedersdorf, confiding almost entirely of it. In the same manner it is the characterizing rock of the Bohemian mountains mining district. It is also found in Silhesia, Carinthia, in some parts of the Black Forest in Suabia; nor is it wanting in the Taurisian mountains, in Salzburg, in the Swiss Alps, the Pyrenees and Volgse, in Scandinavia, Greece, &c. In Great Britain it has been observed particularly in Scotland, in the islands of Coll, Tiree, Rona, and in the Shetland islands. It should however be observed, that frequently other rocks have been described as gneisfs by topographical writers.

The economical use made of gneisfs is that for paviug, and for the conduction 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 almost all buildings are constructed of gneisfs, but also the scaling of the shafts and levels is most advantageously executed in this useful rock.

GNEISON, in Bedoin, a town so called in the island of Terragia and others of the Moluccas, which is named in the Malay language Mengoe, or Mengoe, a word apparently of the same derivation, whatever that may be. See GNETUM.

GNERDEN. in Geography, a town of Persia, in the province of Irak; 150 miles E. of Hafzan N. lat. 32° 20'. E. long. 55°

GNERKOUTEGH, a town of Birmail, on the Pra-waddys; 60 miles N. E. of Peshawry.

GNERSEN, or GNESEK, a city of Poland, in the duchy of Warsaw, built, as it is said, by king Lechus I. founder of the monarchy, and called Gnozy, from an eagle's nest found there, denominating in the Polish language Gnezdn. The kings of Poland were crowned in this city, and the regalia were kept here till, in the year 1320, they were removed to Cracow. During the independent existence of Poland, it was famous as the see of an archbishop, who was primate of Poland, and who acted as interrex or regent upon the king's demise; and who also announced the event, convoked the diets and districts of convocation, and performed the functions of royalty. Gneza is 160 miles N. E. from Breslaw, and 150 W. from Warsaw. N. lat. 52° 26'. E. long. 17° 42'.


Gen. Ch. Col. Cattoon composed of several remote, calous, thickened whorls, each subtended by a small partial calyx, which is poliat, orbicular, flat, entire, containing several scaly florets, the male ones inferior, the females superior, in the same whorl. Periacth of the male a minute, ovate, coloured scale. Cor. none. Stem. Filament one, thread-shaped, longer than the scale; anthers in pairs, connected.


Obf. Linnaeus observes that Rumphius makes his plant diocious, but he found it monocious, and even few one catkin entirely male, standing on its own footstalk, near a female floret. The Thoa of Aublet, though somewhat differently described, is undoubtedly the same genus, and indeed so like the original Gnetum in foliage, that it is not very easy to distinguish them.

1. G. German.
1. *G. Guenon*. Linn. Mant. 125. (Guenon domesticus; Rumph. Ambobin. v. i. 181. t. 71. 72. Beroentis fruticus; Clus. Exot. 55)—Lateral veins of the leaves prominent, inter-branching archwise half way towards the margin. Catkins opposite, axillary, on simple flanks.—Native of the Molucca islands, and other parts of the East Indies. We have it from Java. A tree, with straight, round, slender, smooth branches, swelling at each joint, under the infection of the leaves, and somewhat forked at the ends. Leaves opposite, flalked, ovate, inclining to lanceolate, pointed, entire, smooth and shining, three or four inches long, furnished with a midrib, channelled above, prominent beneath, sending 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. *Stipula none*. Fruit flalks half an inch long, channelled and keeled. Catkins axillary, shorter than the leaves, two together from each opposite leaf, on simple flanks, their whorls when young crowded, but four becoming digitate and bead-like, every whorl bearing numerous females as well as male flowers. What *Linneas* describes as a torn fede in the former, seems rather a very dense assemblage of short tufted fibres. Fruit the size of an ordinary acorn or filberd, its coat thin, sweetish according to Rumphius, but with too much certain to be eaten raw; as is also the case with the leaves, which, when fried, are in almost daily use among the natives of Ambonays, though thought mauvish and inuspid by Europeans.

2. *G. Theo*. (Thoa urens; Aubl. Guian. v. 2. 874. t. 356.)—Lateral veins of the leaves obsolete, inter-branching archwise. Catkins on simple flanks, from the repeated forks of the branches.—Gathered by Aublet in the woods of Guiana, where the natives call it *Thoa*. His own specimen in our possession has no justification or incoherence, 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 flat and less 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 deforced 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 fowl or pleasant 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 tafteless watery liquor runs out, which may be drank by those who are defirfed 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. Guenon*, that it might almost afford a specific character, but Rumphius describes the same circumstance in what he terms his male *Guenon*, and Linnaeus adverted to something like it. It should seem therefore that in the first, if not in every species, the genus is imperfectly distinct, one tree bearing catkins with female flowers, with perhaps less 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 *Thoa*. Such examples throw great light on the physiology of vegetable generation, and confirm the Linnaean theory.

3. *G. fuciculare*. Buchanan MSS. (Guenon fuciculare; Rumph. Ambobin. v. 5. 12. t. 8. Ula; Rheed. Hort. Mal. v. 7. 41. t. 22.)—Lateral veins of the leaves separate to the margin. Catkins opposite, axillary, on branched flanks.—Native of Ambonays and other places in the East Indies. This is a long trailing branching smooth *fureus*, turning black in drying, which the two former do not. The leaves are four or five inches long, various in breadth, pointed, firm, shining, distinguished by their veins continuing distinct to the edge of the leaf. The flower-flanks 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 unlike compared to the Hortus Malabaricus to Long Pepper. Each flanks on a partial leaf, of about its own length. The fruit refines that of the foregoing, and is rounded over the fire, which renders the kernel edible. The tender leaves serve for a pot-herbs, like thole of *G. Guenon*. The bark of the young twigs, split into thread, serves to make nets.

Rumphius's vol. 5. t. 17, which he calls *Fruits Guenoniiformis*, but of which he seems not to have known the flowers, may possibly be that male plant of our half-described species, bearing only one or two female flowers at the bottom of the flanks of the male catkins, according to the analogy observed in the foregoing ones. 8.

GNIADA, in Geography, a town of Hungary; 7 miles W.S.W. of Pestoa.

GNIDIA, in Botany, from Gnidos, where Venus had her temple. A seed, reported to be brought from thence, had been called *Convolvulium*, and there is a *vitis*, or *Kisse*, supposed to be a kind of Orache; but Linnaeus probably had not the least idea of the affinity of this genus to *Pafferia*, named after a favourite bird of the goddess, in allusion to which it was first named *Sternia* by Van Royen. It is moreover akin to *Daphne*, one species of which, *Daphne Guidentia*, has been taken for the ancient *yanoos*.


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, subelliptic, flat, inferted into the edge of the tube of the calyx, and shorter than its limb. Stam. 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. Pfl. Germin ovate, superior; style thread-shaped, as long as the tube, inferted laterally into the germin; stigma capitulate, hispid. Peric. a dry berry, with a thin coat. Seed solitary, ovate, obliquely pointed.

Eff. Ch. Calyx funnel-shaped, four-cleft, withering, including the framents. Petals four, inserted into the calyx. Style lateral. Seed coated.

Obf. It differs from *Pafferia* only in having petals; which are often rather of a glandular appearance. The habit is altogether that of *Daphne* and *Pafferia*. Willdenow enumerates sixteen species, but of these *G. parciflour* and *radiata* are one and the same, and *G. disphacophila*, Linn. Suppl. 255, seems rather to belong to *Dios*.

All the genuine species are natives of the Cape of Good Hope, of a humble flabby growth, with white or yellowish sweet-scented flowers.

GNIEWE, or Mave, in Geography, a town of Prussia, in the province of Pomerania, on the Vistula; 50 miles S.S.E. of Danzig.

GNOIEN,
GNOIEN, a town of the duchy of Mecklenburg; 21 miles E.S.E. of Rottlock. N. lat. 53° 59'; E. long. 12° 52'.

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 shipping-place 200 yards below Neath bridge, on the Neath river; crosses the Neath canal on a wooden bridge, and proceeds about one and a half a-mile to the late Sir Herbert Mackworth's Gaol collieries, of run coal, which are driven up forty fathoms, to be loaded into the waggon on this waggon-way, which has so far 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. Vigener calls them Gnomoni: the females of this species are called Gnomides.

Vigenel de Marville, in his Melange de Histoire et de Literature, tom. i. p. 230, gave 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 of brutes upon earth.

He added, that some philosophers of that sect held that these spirits were of two sexes, for the two sexes of beasts 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 animals and animalcules, 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 lay hold of all machines indifferently, but of those suited to their own character, element, &c. that a haughty one, for instance, feizes a Spanish gennet; a cruel one a tyger, &c.

Gnome, Gnomon, or chrise, is also used for a short, pity, 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 fana in corpore ratio." The writers of rhetoric distinguish several kinds of gnomes, according as they turn on words, on actions, or both; denominating them verbal, affure, and mixed gnomon or chrise. See ARGUMENT.

GNOMON, in Dialling, is the style, pin, or cock of a dial, the shadow wherein points out the hours.

The word is Greek, γνωμων, which literally imports something that makes a thing known; because the style or pin indicates or makes the hour, &c. known.

The gnomon of every dial is suppos'd 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 retrenched or taken away, the other three will make a gnomon, ordinarily called a square.

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 $\Delta ABC$, Plate VIII., Gnomen $= x^2 + y^2 + z^2$. If $\phi = \delta$, 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 cosine 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 pubic 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 almost 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 Megaleses about three centuries before the Christian era. Pliny mentions an obelisk erected by Auguslus: this obelisk was brought from Egypt, and was said to have been made by Scopolius, near a thousand years before Christ. It was used by Manlius for the fame purpose for which it was originally designed, 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-čhew King.

Ulugh Beig, in the year 1437, 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 Tufenelli constructed a gnomon in the cathedral of Florence, whose height was 280 feet. Ximenis required this, and published an account of it in 1757.
Gnomic

Gnomic Column. See Column.

Gnomic, Polyhedron. See Polyhedron.

Gnomonic, or Gnomonical Projection, which that 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 gnomonic projection is also called the "horologigraphic projection," because it is the foundation of dialing. 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. Emeron, 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, Art. Gnomon, or Gnomonics, the art of dialing, 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 hyle.

Gnosimachi, in Ecclesiastical History, an ancient hand in religion, whose distinguishing character was, that they were professed enemies of all studied knowledge in divinity. The word is gnos维奇, q. d. an enemy of wisdom or knowledge.

Damascenus says, that they were perfectly averse from all the graces of Christianiety, i.e. all the science or technical knowledge thereof. They held it an unfeels labour to seek for graces in the holy scriptures; and said, that God requires nothing of men but good works; that it were, therefore, much better to walk with more simplicity, and not to be so folicitous about the dogmata of the gnostic life.

Gnosus, in Antiquities, a town of the island of Crete, more anciently called "Ceratius," from the name of the river which watered it. It was the fixed residence of Minoes, once the capital of the island, and, according to Strabo, a wealthy and populous place, being 30 furlongs in compass, and full of inhabitants. This writer places it 20 furlongs from the Aegean or Archipelago, and 60 from the African sea. Its port, called Herakleum, was at a considerable distance, according to Oliver about four or five leagues to the eastward. Paulinianus (Attic) says, that it had a lake. From this town Arion, so much celebrated by the poets, derived the name of Grus. When the island was reduced by the Romans, Gnozus was humbled, and Gortyna, her rival, raised upon her ruins. Somnian says, that a small village, Cnis, near Candia, would recall to mind the site of the ancient town, were it not discoverable, in a manner no
G N O

G N O

Gnostic's, in Ecclesiastical History, ancient heretics, famous from the first rise of Christianity, principally in the East.

It appears from several passages of the sacred writings, particularly 1 John i. 18; Tit. vi. 20, and Col. ii. 8, that many persons were infected with the Gnostic heresy in the first century; though the doubt did not render itself conspicuous, either for number or reputation, before the time of Adrian, when some writers erroneously date its rise.

The word is formed of the Latin gnostics, and that of the Greek γνωστικος, knowing, or γνωσης, I know.

The name Gnostic was adopted by all of this fact, as if they were the only persons who had the true knowledge of Christianity. Accordingly they looked on all the Christians as simple, ignorant, and barbarous persons, who explained and interpreted the sacred writings, in a too low, literal, and unedifying signification.

At first, the Gnostic's were only the philosophers and wit's of those times, who formed for themselves a peculiar system of theology, agreeable to the philosophy of Pythagoras and Plato; to which they accommodated all their interpretations of scripture. These enthusiastic and self-sufficient philosophers boasted of their being able to restore mankind to the knowledge (gnostic) of the true and Supreme Being which had been lost in the world. They also forecast the approaching defeat of the evil principle, by whom they attributed the creation of this globe, and declared, in the most pompous terms, the destruction of his associates, and the ruin of his empire. But

Gnostics afterwards became a general name, comprehending divers sects and parties of heretics, who rove in the first centuries, and who, though they differed among themselves as to circumstances, yet all agreed in some common principles. They were such as corrupted the doctrine of the gos pel by a profane mixture of the tenets of the oriental philosophy, concerning the origin of evil and the creation of the world, with its divine truths.

It was one of the chief tenets of the philosophy of the Christian Gnostics, that rational souls were imprisoned in corrupt matter, contrary to the will of the Supreme Deity. In conformity to the opinion of the oriental sages, who expected an extraordinary messenger from the Most High, endowed with wisdom and invested with authority to communicate to miserable mortals just notions of the Supreme Being, and to deliver them from the chains of the tyrants and usurpers of this world, they believed, when Christ appeared and wrought miracles of the most astonishing and marvelous kind, that he was the expected and wished-for messenger. Accordingly they imagined that he would relieve men from the power of the malignant genii, or spirits, to which, agreeably to their doctrine, the world was subject, and so free their souls from the dominion of corrupt matter. Having admitted this supposition, they interpreted, or rather corrupted, all the precepts and doctrines of Christ and his apostles, in such a manner as to reconcile them with their own erroneous tenets.

Such were the Valentinians, Simonians, Carpocratians, Nicolaitians, &c.

Gnostics, a denomination sometimes also more particularly attributed to the successors of the first Nicolaitans and Carpocratians, in the second century, upon their laying aside the names of the first authors. Such as would be thoroughly acquainted with all their doctrines, theories, and visions, may consult St. Ireneus, Tertullian, Clemens Alexandrinus, Origen, and St. Epiphanius; particularly the first of these

writers, who relates their sentiments at large, and confesses them at the same time; indeed, he dwells more expressly on the Valentinians than any other sort of Gnostics; but he shews the general principles wherein all their mistaken opinions were founded, and the method they followed in explaining scripture. He accuses them with introducing into religion certain vain and ridiculous genealogies, i.e. a kind of divine precessions or emanations, which had no other foundation but in their own wild imagination.

In effect, the Gnostics confounded, that these xenos 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 on the gospels and the epistles of St. Paul, but also on the law of Moses and the prophets.

These last 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 taught; alleging, that he was actuated by the malignant author of this world, who confounded his own glory and authority, and not the real advantage of men. Their persuasion that evil refixed in 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 re-union with the immortal spirit. Their notion, that malevolent genii presided in nature, and occasioned diseases and calamities, wars and desolations, induced them to apply themselves to the study of magic, in order to weaken the powers or supplant the influence of these malignant agents.

The Gnostics confounded Jesus Christ as the Son of God, and, consequently, inferior to the Father, who came into the world for the refuge 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 xenos or emanations under the Word, the Life, the Light, &c. They divided all nature into three kinds of beings, viz. lyic, or material; psichic, 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 psychic, 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 antient rules of life, recommended rigorous abstinence, and prescribed severe bodily mortifications, with a view of purifying and exciting the mind. However, some maintained, that there was no moral difference in human actions; and that, confounding right with wrong, they gave a leafy ruin to all the passions, and averted the innocence of following blindly all their motions, and of living by their tumultuous debates. They supported their opinions and practice by various authorities: some referred to fictitious and apocryphal writings of Adam, Abraham, Zeruiaher, Christ,
and his apostles; others boasted that they had deduced their sentiments from secret doctrines of Christ, 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 these mysterious parts of theological science by Thendas, 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 Prisillianists.

(See Moheim's Ecc. 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 point he labours in the seventh book of his Stromata, where he shews, that none but the Gnostic, or learned person, has any true religion. He affirms, that were it possible for a knowledge of God to be separated from eternal salvation, the Gnostic would make no scruple to choose the knowledge; and that if God would promise him impunity in doing of anything he has once spoken against, or offer him heaven on those terms, he would never alter a whit 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 preserves 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 dissolute lives of the persons who bore it; much as, in the present age, it has fared with the name gnostik, piastis, &c.

GONI, 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 white. This animal inhabits the country of the great Namaquas, 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, furrowing the ground with its horns and legs. It is a singular animal, having the body like a horse, with a thick bull-like head, elegant taper legs like a deer, and the lachrymal furrows of the Antelope tribe. It is about 6 ft. long, and 3 ft. high at the shoulders; of a rusdy brown colour, having its hair tint with white, but on the breast and fore-legs 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 horse; the feet have only one spurious hoof on each. The flesh is reckoned very good.

GOA sometimes used in Law, in a special signification. Thus, to go without dry, and to go to God, denote as much as to be dismissed the court, and to be acquitted.

GOA, in Geography, an island in the East Indian sea, near the west coast of Hindostan, separated from the continent by a river called "Mandova;" 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 flout 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 seat of an archbishop, taken by the Portuguese general Albuquerque in 1513 from a prince of Sarscan 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 castles and towers, and furnished with abundance of good cannon. Beyond these castles the channel becomes narrow, threatening sometimes to one, sometimes to two miles, and its banks are planted with the best fruits and finest 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 foot walk 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 Murmagon, formed by the other channel, that runs between the island of Goa and peninsula of Saffle, and affords a safe retreat to the Portuguese and other ships, when they are shut out of the port by the sands which are brought down by the river Mandava, in consequence of the high tides of June, and till the passage is opened in October. This port of Murmagon is defended by a castle on the island of Saffle, and a good garrison. At the fouthern 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 which 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, Melitzos, and Canarians, 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 said 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''.

GOA, or Goa, a kingdom on the west and south-west coast of the island of Cebes, which, after various conflicts 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 Telia; and was taken by the Dutch in 1775. S. lat. 5° 12'. E. long. 119° 11'.

GOACHO, 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 teamlabour. It has frequently, like a, a leather thong attached to the contrary end of it, so as to form a sort of whip.

GOAFFI, in Geography, a town of Africa, in the kingdom of Mandinga, on the Senegal.

GOAHIROS, a nation of South America, situated between the jurisdiction of Maracaibo and the Rio, or 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 profiting 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 Tata," the Pap 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 afford them with advice, and supply them with arms. These 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 aggregations of such troublesome neighbours. The Spanish city to which they chiefly resort is Rio-de-la-Hache, depending upon the vice-royalty of Santa Fe, 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 beams of burden. Dreading imposition, they have never adopted the use of specie, but barter their horses and oxen chiefly for spurious 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 hostilities, 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 traversing the country of the Guahios, 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 drefs 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 fish in their own ports, and horsetails, muses, and oxen. Their ferocity is such, that even the English will seldom go far from them in order to venture on shore, but the business of bartering is transacted on board, and the ships hafien to depart. The ships that are accidentally cast upon the coast, immediately become the prey of these cannibals, who massacre the crew and devour their flesh; dividing the cargo among those who are present on the occasion. The Guahios are said to be a formidable nation, well mounted, armed, and disciplined; and able to bring into the field 40,000 effective men.

On the eastern part of the territory of the Guahios are the "Cocinas" Indians, who live like savages, but are so cowardly and pusillanimous as to allow the Guahios to exercise an authority, which the bold always acquire over the timid. These savages are, in fact, merely the slaves of other savages. Depots's travels, vol. iv.

GOAL. See GAOL.

GOAL-PARAH, in Geography, a town of Hindoostan, in Bengal, situated on the Burhampootor, and on the borders of Assam; where the Europeans have factories, who carry on a considerable trade with Assam, Bootan, Thibet, &c.; 32 miles E. of Rangamathy.

GOAN, the name of a Persian tree, of the ashes of which they make a sort of antidote, or medicinal powder, for dizziness of the eyes.

GOANOOGOOGA, in Geography, a town of Hindoostan, in Marawar; 8 miles N. of Tripolore.

GOANADA, a naked, savage and ferocious race, who inhabited the extensive and unexplored wild-ness, E. of Nagpour, in Hindoostan, which is pervaded by the great river Bain, or Buun Gongo, and terminates in the mountains bounding the English circuits.

GOAR, St. a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Simmers, situated on the west side of the Rhine, in which there is, near this place, a water-fall; 16 miles S. of Coblenz. N. lat. 50° 8'. E. long. 7° 43'.

Goat-vetch, a name sometimes applied to the summer vetch. See TARE and VETCH.

GOARING, on Shipboard. The foremen by a sail is cut going, when it is cut foaping by degrees, and is broader at the chaw than at the ear-ang, 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 CAPIA.

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 but little keep for any other sort of animal. The goat is capable of climbing the steepest rocks, and of browsing upon the briers, heath, and shrubs of several different kinds, which are rejected by other sorts of animals. When turned into pastures, they should consetually be prevented from nipping the young shoots of trees and other woods, as they prefer them to the grasses.

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 sort 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 Caarmovonsiro, killed merely for the object of their fleece; which is capable of being made into candles of a superior quality to those of the common kind.

Their horns constitute valuable handles for tucks and pen-knives. The skin of the young kid is well suited to the glove manufacture, 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 flesh affords a cheap and abundant food for the winter months, especially when the kids have been fed early to market. The calves of the goat are often salted and dried, and supplied all the uses of bacon; and are known by the Welsh under the name oeub yr wedden, or hung venison.

In choosing goats for keeping, the following directions should
should be attended to. The male should have a large body, with long hair, and straight fluff legs, the neck should be plain and short, the head small and flender, the horns large, the eyes prominent, and the beard long.

The female ought to have a large wadder with well fixed teats, and with none or very small horns.

Goats are kept in flocks, in order that they may have the use disposition to struggle; and they should have good shelter both for summer and winter, great heat and cold being equally injurious to them.

The period of coupling them is about December. They are mostly kept without litter in the winter season, in clean paved yards or other places.

The kids may be prepared for the table in a manner familiar in some degree to that of the lamb. They have been vulgarly supped useful in stables from the disagreeable odour that issues from the males at particular seasons, but there are probably no real grounds for such a conclusion.

Goat-fish, Caprius, in Ichthyography, 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 scales have more the appearance of those of a salmon than those of the fish; for they are placed in cancelled lines intersecting one another, and are so well fixed, that they can only come off; and wood or ivory may be polished with the skin, as with the common fish-skin used 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 Islands, 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° 53'. E. long. 76° 51'; and the latter about a mile N. W. from it.

Goat Field, the southermost of the Bashee islands, in the East Indian sea. N. lat. 20° 6'. E. long. 121° 30'.—Allo, a small island among the Philippines, near the S. W. coast of Luzon. N. lat. 13° 57'. E. long. 120° 13'.—Alfo, a small island of America, in the latitude of Rhode Island, opposite to the town of Newport, and on which is Fort Washington.

Goat’s Beard, in Botany. See Tragopogon.

Goat’s Eye, in Surgery. See Eye.

Goat’s Horn, petrified. In Dr. Grew’s “Rarities of Gra- fiham College,” p. 257, a Tephrites hurtii, 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 ashen colour, inwardly blue grey, outwardly mixed with oblique and white streaks, bended, one end thicker than the other; it is added, that such are found in Germany, Moravia, Silesia and other parts, and effervesce with nitric acid.

In the Analysis of the Labours of the French national Institute for 1809, it is mentioned that M. Cuvier in the alluvial soils near Etampes has 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 fossil horns of this clafs to have really belonged to goats; and analogy would justify us rather, in referring them to the extinct race of animals, fish, and vegetables with which the strata are so abundantly flored, in some parts of the series.

Goat’s Rue. See Galega.

Goat’s Suckers. See Caprimulgus.

Goat’s Stones, greater. See Lithrolphus.

Goat’s Stones, lesser. See Orchis.

Goat’s Thorns. See Anthriscus.

GOATFIELD, in Geography, a mountain of Scotland, in the island of Arran; the summit of which is 2842 feet above the level of the sea.

GOAVE, GRAND, a town of the island of Hispaniola; 10 miles S.W. of Leogane.

GOAVE, Petit, a sea-port town of the island of Hispaniola, 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 Goave, and other places, fend their commodities; 26 miles W.S.W. of Leogane. N. lat. 18° 26'. W. long. 73° 37'.

GOBAN, a town of Persia, in the province of Chufidan; 75 miles S. of Sujur.

GOEB, or Geob, a small island in the mouth of the Euphrates, or Shat el Arab, at the entrance into the gulf of Peria, with a town upon it; 50 miles E.S.E. of Baffora. N. lat. 35° 10'. E. long. 48° 25'.

GOBANNIUM, in Ancient Geography, a town of Brit- ain, placed in Antionius’s itinerary between Burrim or Ukle, and Magnus or Kencheller, 12 miles from the former and 22 from the latter, and supped to be Abergavenny, which was.

GOBI, in Geography, a country of Africa, between that of Camma, and cape Lopez Gonfalvo; 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 hole-ling fluff and other refuse of their works; also for the hollows or spaces behind them, into which they throw the refuse coal, earth, and stones: which latter are also called waffles and old-hollows.

In the coal-pits about Wednesbury in Staffordshire, and at Donifhorpe, Danby-Hall, &c. in Derbyshire, the gobbins take fire spontaneously after some time, unless the air is excluded from them, owing to dunes, tow, taw or cat-dirt, a thin stratum found near the coal, which heats, fires, and spontaneously inflames, by the contact of air and moifure. At Donifhorpe they encase their gobbins in walls of tempered clay at certain distances, for excluding the air.

GOBBS, otherwise Cobblers, are pieces of coal from the size of walnuts to that of a man’s fist or larger, which are occasionally picked or raked out of the deck or refuse small coals at the collieries, either by poor persons, 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. When the situation among the buyers and dealers is for large coals, as about Wednesbury in Staffordshire, and the Crewe vale in Derbyshire and Nottinghamshire, an inconceivable waste is made of cobbles and fiek: in working the thick coal about Wednesbury a heap of such, six or seven yards thick, is said to be left and wafted on the floor of their works; and
and to occasion a further waste of a rib or wall of solid coal, round each hall or chamber, for excluding the air, which would otherwise fire the walls of its. See Gobelin.

GOBELINS, a celebrated manufactury, 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 manufactury is carried on was built by two brothers, Giles and John Gobelins, 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 Biere, 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 "Gobelins' Folly," changed its name into that of "Hotel Royal des Gobelins," in consequence of an edict of Louis XIV. Mon. Colbert having re-established, and with new magnificence enriched and completed the king's palaces, particularly the Louvre and Thalieries, 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, enamellers, &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 fourteen articles.

By these it is provided, that the new manufactury shall be under the administration of the superintendent of the king's buildings, arts, &c. that the ordinary masters thereof shall take cognisance of all actions and proceedings brought against any of the persons in the said manufactury, 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 manufactury of this kind in the world. The quantity of the finest and noblest works that have been produced by it, and the number of the best workmen bred up therein, are incredible; and the present flourishing condition of the arts and manufactures of France is, in a great measure, owing there-to.

Tapestry work, in particular, is their glory. During the superintendence of Mr. Colbert, and his successor M. de Louvois, the making of tapestry is said to have been practiced to a degree of perfection, hitherto 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 conquest of Franche Comte, done from the designs of M. le Brun, director of the manufactury of the Gobelins, are master-pieces in their kind.

GOBEMOUCHE, the fire-creater 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 leaf-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, so they seem 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; where, if they see a fly, they will pursue it over the very hands and clothes of people, or over the dishes, without doing the least hurt.

Notwithstanding their great beauty while alive, they are only of a duncky grey when dead, all their other colours immediately vanishing.

GOBEMOUCHE, in Ornithology, a name given by Buffon to several species of Lanius, Todas, Turdus, Muscicapula, and Motacilla, which he describes.

GOBIN, St., in Geography, a town of France, in the department of the Aine; celebrated for its manufacture of plate-glass; 4 miles S. of la Fere. See GLASS.

GOBIO, in Ichthyology, a species of Cotops; and also of Cyprinus, which he describes.

GOBIUS, a genus of the thoracic order, polliing, according to Linnaeus, the following essential character. Head small, eyes approximated, with two punctures 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 ventral fins united into an oval or funnel shape; and the dorsal fins two in number.

At the time Linnaeus 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 fishes, with such proficiency of the 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 different from each other; though small, 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 confounded to that genus. The later French writers, as Latreille, Bosc, and others, after the example of Lacépéde, divide the Linnean Gobius, and their natural affinities, into four distinct genera, namely, Gobius, Gobioneis, Gobionapus, and Gobionemobius, an extension perhaps requisite, or at least admissible. This extension is indeed, in our own opinion, rather defensible, 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 the recently established genera ought to be in reality considered essentially distinct, or 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 its concealed among the rocks, under stones, or in the sand and mud of seas 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 central fins.

Species.

Genus Gobius—Ventral fins united; dorsal fins two.

† Section. Pectoral fins attached close to the body.

BODDAERT. Rays of the anterior dorsal fin cirrionate, the third very long. Pallias.

Anno.
G O B I U S.

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 fleshy; eyes vertical and oblong; gill-membrane livid. The body is rather convex, tapering slightly towards the tail, and covered with small and soft scales; the colour blueish brown above, beneath pale yellow, inclining to whitish; the back marked with a longitudinal series of seven brown spots, beneath which, on the sides, are seven 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 blueish black, the first including five rays, has the membrane spotted with white; the membrane of the second is remarkable in having six white lines between each ray, these rays are fetaeous, and amount to twenty-five in number; the pectoral fin is roundish, and includes twenty-one rays; ventral, thirty-four; and, twenty-five; and the tail, which is blueish white, eighteen rays.

L A G O C E P H A L I S. 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 Transactions of the Royal Academy of Peterburgh, and afterwards by Pallas in his "Spicilegia Zooloigica." The head is short, thick, and delimited of scales, the mouth transverse; eyes dilated, small, and covered with a common skin; upper jaw very thick, the lower with a few larger teeth, which are a little hooked; the lips ekef in the middle, doubled, the upper fleshy 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 six rays of a simple form, the rays in the second fin, like those of the tail, are brachial, 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.

C Y P R I N O I D E S. Body covered with large sub-ciliated scales; tail rounded; the membrane connecting the rays tefollute with brown. Pallas.

About the size of a finger, the body of a compressed form, thickish, convex, grey brown above, beneath whitish; skin soft and ciliated with fine lines; teeth minute and nearly equal; tongue flat, soft, and obtuse; eyes lateral and between them a blackish semi-lanceolate crest; rays of the fins mostly branched; lateral line obfolete. The species inhabits Ambôna.


Inhabits the brooks and rivers of Martinico, where Plu- nier saw it in great abundance. The body is oblong, and covered with round imbricated scales, which are larger on the posterior part. The head is long and truncate; the eyes vertical with black pupil, and golden iris; jaws equal; tongue soft and acute; cheeks blueish edged with red; lateral line in the middle of the body, and the vent nearer the head; dorsal and anal fins with simple, soft, dilate 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 ferruginous: rays of the dorsal and caudal fins obscurely streaked with the latter. Donov. Gobius minutus; albicans ferrugineo-marainalis, radix dorsofalse, et caudalis ferrigino osse4e, forestis, Pallas. Mi nutus 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 oblique 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 so many series of connected dots. These streaks, or dots are uniform and 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.

"Bloch does not include this species in either of his works on fishes. Pennant considers it as the Gobius aphya of Linnaeus, in which particular later writers are mistaken; it must however be confessed, that there still remains some little doubt as to the precise difference between the aphya 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 sands, called Traeth Levan, which extends along the south-fide of Beaumaris bay; upon the shores of the Severn; and also many other of our sandy coasts, this diminutive fin 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 infrequently captured with the sprats, at a short distance from the shore.

"In the first dorsal fin are fin 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.

A P H Y A. Body and fins barred with brown. Linn. Muf. Ad. Fr. Gobius uniculus, pinnar dorso fuscatae ocularum 17; Art. 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 fifteen or seventeen; pectoral, according to Linnaeus, eighteen, or one less, as Artedi mentions. Linnaeus states the number of rays in the ventral fin at twelve, Artedi at only six, 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 no less than fourteen.


This is an inhabitant of the European and Mediterranean seas; its length is from four to five 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, constitutes, according to Bloch, the characteristic distinction of this particular species. Its haunts are the sandy shores of the sea, and its food telsaceous 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.


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 length, the first containing five rays, the second eleven; pectoral fin twenty; ventral, ten; anal, nine; and tail ten. The species inhabits China.


A fish of small size found in China: the first dorsal fin contains five rays, the second twenty-six; pectoral, nineteen; central, twelve; anal, twenty-five; and caudal, fifteen.

**Bicolour.** Fusce; all the fins black. *Linn.—Brinii pice.

Length from three to four, or rarely exceeding six inches, and inhabits the Mediterranean sea. The rays of the fins project very considerably above the connecting membrane.

**Cuvier.** Mouth plicate with red; rays of the dorsal fins reaching above the membrane. *Brinii*.

About a span in length, the mouth, gill-covers, chin, and fins plicate with fangulous red spots; beneath the eyes a transverse membrane-like line, and two others placed longitudinally before the dorsal fin; fins generally brownish, with fleshy rays; pectoral rounded; ventral blue, with the rays split at the end; tail pointed and slightly banded with black. *Gmelini* is inclined to think this may be only a variety of the species *Jozoi*.

**Pagonellus.** Tail and second dorsal fin purplish at the base; the first dorsal fin edged with a yellowish line. *Linn.* *Gobius pagellus*, Halieuton.

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.

**Arabicus.** Five posterior rays of the first dorsal fin terminating in a red filament twice the length of the membrane. *Forsk.*

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 speckles of blue; skin soft and covered with minute firm scales; fins spotted; tail cuneated.

**Nebulosus.** Second ray of the first dorsal fin ending in a black filament twice as long as the body. *Forsk.*

Inhabits the same sea as the former, and nearly the same size; body whitish, with brown clouded confluent spots, beneath white without spots; scales rhombic and rigid; pectoral fins glaucous; with oblique brown spots at the base; ventral; dorab fin and tail transparent, dotted with brown; anal fin hyaline, with the outer edge black. *Pleuranus.* Upper jaw prominent. *Forsk.*

This, according to Plummer, 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.

**Genus Gobius.**

Ventral fins united; dorsal fin one; head small; gill-covers close nearly throughout their contour.

**Melanurus.**
GOB

**Section. Pectoral fins attached or placed on a free or elongation.**

KOELEUTER. Ventral fins divided; first dorsal 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 fleshy; teeth unequal, conic, the anterior ones larger, and one larger on each side above; aperture of the gills limited; 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 finous; 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 ramose rays.

Genus Gobionurus.

Head small, with the eyes approximated; gill-covers closed nearly throughout their contour; dorsal fin two.

PISONIA. Ventral fins divided; lower jaw longer. Gmel. Amare pisum, P.fo. A small species found in South America. The head is depressed and covered with scales in size equal to those on the back; the mouth furnished with several rows of teeth; and the tail rounded.

Genus Aper, a name given by Geofner and others to a species of perch called by many after piceiulis, a name confounding it with many other different fishes, and by Liuaus perca. It is distinguished among the perch tribe by Artedi under the name of the perch with eight or nine black lines on each side. See PERCA.

Genus Fluviatus, or Gudgeon. See Cyprinus Gobio. Genus Marius, O. Gob. Gobius Niger. Goble, or Gobelet, a kind of drinking cup, or bowl; ordinarily a round figure, and without either foot or handle.

The word is French, goblet; which Salmasius, and others, derive from the barbarous Latin cupa. Budens deduces it from the Greek μελλον, a sort of cup.

Goplets, made of the wood tamaliik, 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 Heraldry, the same as con.

GOBYANGAN, in Geography, a town of Bengal; eight miles 8. E. of Goragot.

GOCEY, a town of Hindoojtan, in Allahabad; 30 miles N. of Gazypour.

COCH, a town of France, in the department of the Roer, and chief place of a canton, in the diocese of Cleves, situated on the Niers, surrounded with walls in 1291, and containing three churches; 12 miles 8. of Cleves. The place contains 2412, and the canton 12,728 inhabitants, in 19 communes.

GOCHELINUS, RODOLPHUS, in Biography, a physician, was born at Wittenberg in 1572. His father was professor of logic at Marburg, where he subject of this article studied medicine, and obtained the degree of doctor in May, 1601; and was himself elected professor of philosophy in 1665, and also professor of mathematics in 1612. He died on the 2d of March 1621, at the age of 40. Although his life was not long, by extreme industry he had written a considerable number of treatises, in which he evinced much of the spirit of Paracelsus, of whom 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 "Dissertatio historica et
philosophica de origine nominis Dei," &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 Teutonic 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
유 in Hebrew, whence the Syr. Chait and Goda; the Arab.
א and God; the Persic cedu and cedu; and the Greek
α and αι; and the Teutonic God; and the German Gotz; 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 all finite, perfect, and
free; as of good nature, wisdom, and power; who
made the universe, and continues to support it, as well as
to govern and direct it by his providence.

The Rabbins and Hebraists, particularly St. Jerom, and
the interpreters, reckon up ten different names of God
in Scripture; which are א, ב, ג, ד, ה, י, ק, ל, מ, נ,
Elohim, or in the singular, א, ב,ג, ד, ה, י, ק, ל, מ, נ,
Eloah, or in the singular, א, ב,ג, ד, ה, י, ק, ל, מ, נ,
Shaddai, or Jebovasb; but it is wrong to
divide א, ב,ג, ד, ה, י, ק, ל, מ, נ, " by one name
thenbeitah, i.e. God of hosts. Of these
names there are three which express the essence of God,
and are proper names; א, ב,ג, ד, ה, י, ק, ל, מ, נ,
Jebovasb: the others are only names of attributes. St. Jerom
gives a particular explanation of these ten names, in his
epistle to Marcella; and Buxtorf the younger has an express
dissertation on the same, "Dissertatio de Nominibus Dei." The
Jesuit Socquet has three several discourses on the three
names, א, ב,ג, ד, ה, י, ק, ל, מ, נ, Shaddai, and Jebovasb,
printed at Paris, 1715.

The Hebrews call the name of God י and the
Greeks, after this example, Τυραννους, as consisting
of four letters, which it is observed to do in most
languages: thus, in the Hebrew God is called י, Jebovasb,
in the Greek, Θεός; in Latin, Deus; in Spanish, Dios; in
Italian, Dio; in French, Dieu; in the ancient Gaulish,
Dios; in ancient German, Diet; in the Slavonic,
Bog; in Arabic, Alla; in the Polish, Bóg; in the Pannonian,
Jha; in the Egyptian, Tnu; in the Persian, Sir; in the
language of the Magi, God. But a distinction ought here
to be made between the name God, and the name of God;
it being the latter, not the former, that in the Hebrew
consists of four letters. The name or word God, in the
Hebrew, is י, Eloah, which consists but of three letters;
or in the plural, י, Elohim, which consists of five.
The name of God is י, Jebovasb, which is the true
name of God, or the name of four letters among
the Hebrews and Greeks. But it is not this name that answers
to the Greek Θεός, Latin Deus, English God, &c. It
is, as י, Jebovasb, is in the Hebrew.

GOD

GOD
G O D.

It is confessed, that God exists necessarily; and by the
same necessity he exists always, and every where. Hence,
also, he must be perfectly familiar; all eye, all ear, all brain,
al 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 definite of all body, and all bodily shape; and
therefore cannot be seen, heard, or touched; nor ought to
be worded under the representation of any thing corpoe-
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, hear only sounds, 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 divine has wrought these thoughts of that
admirable philosopher into form, and ripened them into a
more express syllum, in a discourse on this subject. Max-
well's Difc, concerning God.

We shall here subjoin a compendious abstrakt of the prin-
cipal arguments that have been alleged in proof of the ex-
itence 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,
free something now is, something always was: otherwise the
things that now are must have been produced out of nothing,
absolutely and 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 caufe of its existence, because it includes all
things that are or can ever were in the univerfe: 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, should
never have existed any thing at all, so 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
da 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
supposition 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 necessi-
tively existing being, is the idea of a being, the supposition
of whose 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 nece-
nity 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 subsistence 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 its existence. The
self-existent being, having no caufe of its existence but the
absolute necessity of its own nature, must of necessity have
existed from everlasting, without beginning, and must of
necesity exist to everlasting, without end. 6. The self-
existent being must of necessity be infinite and omnipotenti.
Such a being must be everywhere, as well as always, unal-
terably the same. It follows from hence, that the self-exist-
ent being must be a most simple, unchangeable, incorruptible
being; without parts, figure, motion, divisibility, and
other properties of matter, which are utterly inconsistent
with complete infinity. 7. The self-existent being, must of
necesity 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 intelligent 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 posses from
the intelligence of created beings, which is a real distinct
quality or perfection, and not a mere effect or composition of
unintelligent figure and motion; from the variety, order, beau-
ty, wonderful contrivance, 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 endued 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 good
and proper not to act at all, but to be acted upon. Besides,
if the supreme cause be not endued 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
neceshty 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
God.

ject to him; nothing can resist 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 perfect and consummate excellency 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 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, passim.

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 the traces of evident contrivance and fitness of things for one another that occur through all the parts of it. These confine 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 subserviency; 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 unanswerable evidences of the creating power and wise disposal of an intelligent and almighty agent. The power of gravity, by which the celestial bodies persevere in their revolutions, detects 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 tender 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 orbits, and the present disposition of things. Gravity could not have determined the planets to move from west to east in orbits nearly circular, about 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 large and unwieldy mass into such parts as the sun and planets; and, after carrying them to their different distances, project them in their several directions, preferring still the equality of action and reaction, or the state of the centre of gravity of the system. Such an exquisitely fine 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 presents.

But we should far exceed the proper limits of this article, if, confining our observation to the earth, our own habitations, we were to enumerate only the principal traces of design and wisdom, as well as goodness, which are discernible in its figure and constituent parts, in its diurnal and annual 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 vitiolitude 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 titled law, each fitted to its own element, provided with proper food, and with instincts and organs fitted to its rank and situation, and especially with the powers of sensation and self-motion, and those immediately or remotely subservient to the government and use of man, without admiring the skill and design of the original创建者; for we find there are more signally 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 reasoning,suggests a contriver. It strikes us like a sensation; and artificial reasoning against it may puzzle us, without shaking our belief. No person, 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, Sturmius 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 excellency 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 preserved 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 exist outside of the contriver; and the unity of design shows how 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, shows that his influence penetrates the immost 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 arts, suggest his consummate wisdom. The usefulness of the whole scheme, so well contrived for the intelligent beings who enjoy it, with the internal diffuseness and moral structure of those beings, shows his unbounded goodness. These are arguments which are sufficiently open to the view of cababilities of the unlearned, while at the same time...
fame time they acquire new strength and lucidre from the discoveries of the learned. The Deity's acting and interposing in the universe shew that 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 surpasses our knowledge, tends to preserve an inward generation and awe of this great being, and depiozes 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 Maclaurin's Account of Sir I. Newton's Phil. Disc. Book iv. chap. 9.

Those who wish to see the argument, which has been now stretched out in some of its leading outlines, more fully illustrated and urged, may consult the works of Ray, Newton, &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 we perceive in them, is to tell us, that all which we see must necessarily have some form, and that it might as well be 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 socket; we will say also, that it must have been of that sort of substance, which we call animal substance, 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 consisted, first, of a series of transparent lenses, (very different, by the bye, even in their substances 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 single 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 lenses, 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 lost to the purposes of sensation. That this fortunate combination of the parts should have been the lot, not of one individual out of many thousand individuals, like the great prize in a lottery, or like some singularity 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 exist, and that under various, not casual or capricious, but bearing marks of being suited to their respective exigences; that all this should have taken place, merely because something 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 singularity 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 define no greater certainty in reasoning than that by which chance is excluded from the present disposition of the natural world. Universal experience is against it. What does chance ever do for us? In the human body, for infancy, chance is the operation of causes without design, may produce a wen, a wart, a mole, a pimple, but never an eye. Among inanimate substances, a cloud, a pebble, a liquid drop, might be; but never was a watch, a telescope, or organized body of any kind, answering a valuable purpose by a complicated mechanism, the effect of chance. In no assignable instance hath such a thing existed, without intention, somewhere. Some have said "that the eye, the animal to which it belongs, every other animal, every plant, and every organized body which we see, are only to many out of the possible varieties and combinations of being, which the lapse of infinite ages has brought into existence; and that the present world is the result of that variety."—But "there is no foundation whatever for this conjecture in any thing which we observe in the works of nature; no such experiments are going on at present! No such energy operates as that which is here supposed, and which should be constantly pushing into existence new varieties of beings; nor are there any appearances to support an opinion that every possible combination of vegetable or animal structure has hitherto been tried." Should it be said that the parts of animal bodies were not intended for the use, but that the use arose out of the parts; this distinction is intelligible."—But "there is little place for it in the works of nature. When roundly and generally affirmed of them, as it has sometimes been, its amounts to such another stretch of aertion, as it would be to say, that all the implements of the cabinet-maker's workshop, as well as his fifh-akin, were substances accidentally configured, which he had picked up and converted to his use; that his adzes, saws, planes, and gimlets, were not made, as we suppose, to hew, cut, smooth, shape-out, or bore wood with; but, that these things being made, no matter with what design, or whether with any, the cabinet-maker perceived that they were applicable to his purpose, and turned them to account." If this kind of solution be applied to those parts of animals, the action of which does not depend upon the will of the animal, it is fraught with still more evident absurdity. It is possible to believe that the eye was formed without any regard to vision, that it was the animal itself which found out, that though formed with no such intention, it would serve to see with; and that the use of the eye, as an organ of fight, resulted from this discovery, and the animal's application of it? The same question may be asked of the ear; the fame of all the fenes, none of which depend upon the ejection of the animal, nor consequently upon its fagicity or experience. Others have chosen to confer 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 such explanation, it should seem to be a mere substitution of words for reasons, names for causes. "Was a watch ever produced by a principle of order; and why might not a watch be so produced as well as an eye?"—The confidence," continues the author now cited, "which we place in our observations 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 attempted 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 confounds 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 fulfilled."—"Our ignorance of many points need not suspand our assurance of a few."—"Contrariness," says our author, "if establisht, appears to me to prove every thing which we wish to prove. Amongst other things, it proves the personaliy 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 capacities constitute personaliy, for they imply consciousnes 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 refles, is a person. — "Whenever we see marks of contrivance, we are led for its cause to an intelligent author. And this transition of the understanding is founded upon uniform experience, and a belief, that there may be many second causes, and many causes of second causes, one behind another, between what we observe of nature and the Deity; but there must be intelligence somewhere; there must be more in nature than what we see; and amongst the things unseen, there must be an intelligent designing author;"—"after all the struggles of a reluctant philosophy, the necessary resort is to 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 earnestly 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 univerfe, may be deduced from the universal confluent of mankind, and the uniform tradition of this belief through every nation and every age; it is impossible to conceive, that a falhacy fo perpetual and universal, should be imposed on the united reason of mankind. No credible and satisfactory account can be given of this universal confluent, without ascribing it to the original constitution of the human mind, in consequence of which it cannot fail to deter 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 confluence of mankind in this principle has been sometimes resolved, are founded on this universal principle, suppose it being and influence, and are efculated 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 experience, 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 ceurerence evidence both of the principle and of the fact.

The existence of God is also farther evinced by these 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 Mofes, considered merly 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 conformation is urged by Lucrectius, the famous Epicurean, as a strong presumption that the world had a beginning.

"———Si nulla fuit genitalis origo
Terrarum et cord, femperque externa fueru :
Cur supra bellum Thibaranum, et funera Trojé,
Non alias ali quoque res ecceoares poeta?"

Befides, the origin 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, these, 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 falfe deities of the heathens, many of which were only creatures to which divine honours and worship were superflitiously 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 gave 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 fystem, might become gods, after death; inasmuch their souls might attain to a degree of excellence superior to what they were capable of in life.

The first divines, father Busius observes, 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 weakness of the human mind could not conceive so 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 June.

The first idols, or falfe gods, that are said to have been adored, were the llars, 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. But fire and water became objects of divine worship, for their usefulness to human life. In proof of time, and by degrees, gods became multiplied to infinity; and there was scarce any thing but the weaknesses, or caprices of
GOD

Some devotees or other, elevated into the rank of deity; things
insects, or even defunctive not excepted.

The principal of the ancient gods, whom the Romans
called divi majorum genii, and which Cicero calls civilis
gods, Varro felet gods, Ovid nobles deos, others confrater deos,
were Jupiter, Juno, Vesta, Minerva, Ceres, Diana, Venus,
Mars, Mercury, Neptune, Vulcan, and Apollo. Jupiter
is considered as the god of heaven; Neptune as god of the
sea; Mars as the god of war; Apollo of eloquence, poesy,
and physic; Mercury of thieves, Bacchus of wine, Cupid of
love, &c.

A second sort of gods, called demi-gods, semi-divi, divi mino-
rum genii, indigetes, or gods adopted, were men canonized
and deified. As the greater gods had possession of heaven
by their own right; these secondary deities had it by right
and donation; being translated into heaven because they
had lived as gods upon earth.

The heathen gods may be all reduced to the following
classes:

1. Created spirits, angels, or daemons: whence good and
evil gods; Gemini, Laries, Lemures, Typhoons, guardian
gods, infernal gods, &c.

2. Heavenly bodies: as the sun, moon, and other planets:
also the fixed stars, constellations, &c.

3. Elements: as air, earth, ocean, Ops, Vesta; the ri-
vers, fountains, &c.

4. Meteors: Thus the Persians adored the wind: thou-
der and lightning were honoured under the name of Gery-
on; and several nations of India and America have made
themselves gods of the same. Caltor, Pollux, Teleusa, and
Iris, have also been preferred from meteors to be gods; and
the Pheas has been practiced in regard to comets: what
which appeared at the murder of Caesar. Socrates deified
the clouds; if we may give credit to Ariliophanes; and the
primitive Christians, Tertullian affords us, were reproached
with the same thing.

5. They erected minerals, or follies, into deities. Such was
the Batyllus; the Finlanders adored fomes; the Scythians
iron; and many nations silver and gold.

6. Plants have been made gods. Thus licks and onions
were deities in Egypt; the Selavi, Lithuanians, Celtas,
Vandals, and Persians, 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-
serpina.

7. They themselves gods from among the waters.
The Syrians and Egyptians adored fishes; and the Tri-
tons, Nereids, Syrens, &c. what were they but fishes? Se-
vveral nations have adored serpents; particularly the Egyp-
tians, Puffins, Lithuanians, Samogitians, &c.

8. Insects, as flies and ants, had their priests and votaries:
these among the Thelidans, and those in Armenia, where
bullocks were offered to them.

9. Among birds, the fowl, raven, the sparrowhawk, ibis,
eagle, griffin, and lapwing, have had divine honours; the lift
in Mexico, the relf in Egypt, and at Thebes.

10. Four-footed beasts have had their altars: as the bull,
dog, cat, wolf, baboon, lion, and crocodile, in Egypt, and
elsewhere; the hog in the island of Crete; rats and mice in the
Transal and at Tenos; weasels at Thebes, and the porcupine
throughout all Greece.

11. Nothing was more common than to place men amon-
g the number of deities; and from Besus or Baal, to the Roman
emperors before Constantine, the influences of this kind are
innumerable; frequently they did not wait so long as their
deaths for the apotheosis. Nebuchadnezzar procured his fature
to be worshipped while living; and Virgil shews that Augus-
tus had altars and sacrifices offered to him, Eclog. i. 6, 7
As we learn, from other hands, that he had priests called
Augufalea; and temples at Lyons, Narbona, and several
other places; and he must be allowed the first of the Romans,
in whose behalf idolatry was carried to such a pitch. The
Ethiopians deemed all their kings gods: the Velleda of the
Germans; the Janus of the Hungarians; and the Thau,
Woden, and Afia, of the northern nations, were, indis-
putably, men.

12. Not men only, but every thing that relates to man,
has also been deified: as labour, rest, sleep, youth, age, death,
virtues, vices, occasion, time, place, numbers, among the
Pythagoreans; the generative power, under the name of
Priapus. Infamy, alone, had a cloud of deities; as Vage-
tanus, Levana, Ruminia, Eduba, Potina, Cuba, Cuminia,
Carna, Offaligo, Statulimus, Fabulimus, &c.

They also adored the gods health, fever, fear, love, pain,
indignation, flame, impudence, opinion, renown, prudence,
science, art, hideity, felicity, calmnety, liberty, money, war.

Lastly, nature, the universe, or so a/, was reputed a
great god.

Heothol has a poem under the title of Deipara, i.e. the ge-
genation of the gods; wherein he explains their genealogy and
decent; feds forth who was the first, and principal; who
next descended from him, and what issue each had; the whole
making a sort of fylum of heathen theology.

Beside this popular theology, each philosopher had his
fylum; as may be seen from the Timaeus of Plato, and
Cicero De Natura Deorum.

Justin Martyr, Tertullian in his Apologieges, and in his
book Contra Gentes; Arnobius, Minutius Felix, Laclau
tius, Eufebius, Prepar. & Demontil. Evangel. St. Augustine De
Civit. Dei, and Theodoret Adverf. Gentes, shew the vanity
of the heathen gods.

It is very difficult to discover the real sentiments of the
heathens with respect to their gods: they are exceedingly in-
tricate and confused, and even frequently contradictory.
They admitted so many inferior and inferior gods, who shared
the empire, that all was full of gods. Varro reckons upon
 gods among a small extent of ground, and yet
their number was every day growing. The way to be-
\n
heaven was so easy for the great men of those days, that Juvenal
brings in Atlas complaining he was ready to sink under the
load of such a number of new gods as were daily placed in
the heavens: yet father Maugues seems to have proved that
all the philosophers of antiquity have acknowledged in
that there was but one God. Plan. Theol. des Sct. Scavans.
de la Greece.

God, A2 of. See Disability.
God, Peace of. See Peace.
God, Son of. See Son.
God, Truth of. See Truth.
God, Worship of. See Worship.

GODAGARY, in Geography, a town of Bengal; 18
miles N. of Moommedabad.

GODALMING, a market town and parish in the
county of Surrey, England, contains 474 houses and 3435
inhabitants. The town is built in a valley, on the banks of
the river Wey, which is divided into several small streams
here. The chief of these is navigable to Weybridge, where
it unites its waters with the Thames. In the vicinity of
the town are some corn-mills, and paper-mills. Here are several
manufactories for weaving stockings, patent fleece hony
cloth, and coarse woollen cloths; wool-combing and spinning
of worsted also constitutes part of the trade of the place. The
parish
parish of Godalming is divided into nine tythings, and the whole is governed by a warden, eight assistants, and a bailiff. The church is distinguished by its handsomc frieze. In the town are a Quaker's meeting-houfe, two chapels for dissenters, a charity school, and in the immediate vicinity is an hospital for the accommodation of ten poor men. A singular impostion on public credulity and curiosity was practiced in this town about the year 1726. A female, named Mary Tofts, circulated a report that she was pregnant with rabbits, and also excited a very general belief that she had actually been delivered of some of these animals. The impostion, like that of "the Cock-lane ghost," was supported by so much cunning and address, that many persons, among whom were some of the faculty, were deceived, and, for some time, credited the tale. Godalming has a weekly market on Saturday, and two annual fairs. Manning's History and Antiquities of Surrey, folio.

GODAMA, GODEMA, GOAUNA, GOANA, or GONAM, in Indian Mythology, different names applied in various parts of India, and particularly in the Birman empire, to their deity Budha, or Bouddh. (See Bouddh.) Godama or Godama is the most common appellation among his worshipers in India beyond the Ganges; it seems also to be common among the Hindoos, who, according to the account of the Sanerit, write it Gotamans. This name, as some say, literally signifies cow-herd, but metaphorically king; and, according to others, the meaning of Godama is eminently wife, or a fagc. Many other appellations are given to this deity derived from the pastures in which his various images represent him. Godama was probably an Indian prince, deified by superstitition; and in an ancient treatise, giving an account of the religion of Godama, entitled "Zaralaa," 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. Buchanan, who cites this treatise (Af. Ref. vol. vi.) places the death of Godama 546 years B. C. The doctrine and laws, laid in this treatise to be delivered by Godama, consist chiefly in observing the five commandments, and in abjuring from the ten sins. The five commandments are as follow: 1. From the meanest infect up to man, thou shalt not kill any 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 inebriating drug. The perfon 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—thrift—adultery—falsehood—idol—harsh and indignt language—idol 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 abhors from these sins, will successively increase in virtue through all his five finer 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 priests of Godama are called Rahans in the Birman language, and they have also bestowed upon them the title of Somona 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 largest and most celebrated temples are 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 devotees 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 impreffions of his feet. The principal deificales of Godama are by his followers considered as saints; 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 feasts for which are those of the four phases of the moon, especially the full and change, which may be considered as the Burma fiffhathis. 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 tea of Godama effecrs the opinion of a divine being, who created the universe, to be highly impious; and accordingly the flowers of Godama are, strictly speaking, atheistic, as they feep 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 Birman Empire, and Bouddh.

GODANA, in Geography, a town of Peria, in the province of Irak; 105 miles E. of 11pahan.

GODAVERY, or GONGA GONOWAY, a river of Hindoostan, sometimes called the Gang in Perihtta's History, was, till very lately, considered as the same with the Cottack river, or Mahanadi; but it is now ascertained to be a different river, which has its source about 70 miles N. E. of Bombay; on the western Goutts, more properly called the Sreekien mountains; and, in the upper part of its course, at least, is esteemed 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 Dowlatabad boufah, and the country of Tellingana, from west to east, turns to the south-east; and receiving the Bain Gonga, about 90 miles above the sea, besides many smaller rivers, separates into two principal channels at Ramundry; and hence dividing again, they form altogether several tide harbours, for vessels of moderate burden. Ingeram, Caringa, Yanam, Bandarmeines, and Naraposun, 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 ship-timber for the use of the ports above-mentioned. The Kistnnah 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 track of country, composed of rich vegetable mould, such as is usually found at the mouths of large rivers. Rennell. See Delta.

GOD-BOTE, in our Author Saxon Catalog, an ecclesiastical or church fag, for crimes and offences committed.
G O D

against God. These, according to Blackstone, are opacy and deoey; which fee.

G O D D A R D, JONATHAN, in Biography, an eminent
physician and chemist, was born at Greenwich in the year 1617. After studying for four years at Oxford, he lent out on his travels, and, on his return, settled in practice in London, having taken his degree at Cambridge. He was elected a fellow of the College of Physicians in 1646, 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 affiduous. 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 ufferer 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 28th, 1641. He obtained many favours from Cromwell, who first made him
warden of Merton college, Oxford, afterwards sole representative of that university in the Short Parliament in 1653; and in the same year one of the council of state. These favours were sufficient to procure for him the displeasure of Charles II.; and, being driven from Oxford, he removed to Oriel college, where he had been chosen professor of phy-
sic 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 chem-
istry, principally from a diffidence in the knowledge of apo-
thecaries, 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, fetting forth the unhappy condition of the practice of physic in London,” 1669. But this was of no avail. He died on the 23d of March, 1674, being feized
with an apoplectic fit in Cheapside, when returning from one of the philosophic meetings. Two papers of his were published in the Philosophical
Transactions, N. S. 137, 138; and many others in Birch's History of the Royal Society.

G O D D E S S, 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 charity; Proserpina, the goddess of hell;
Venus, of beauty; Thetis, of the sea; such also were
Victory, Fortuna, &c.

Nay they were not contented to make women gods, and
admit both sexes into the roll; but they had also herma-
phrodite gods. Thus Minerva, according to several of the
learned, was both man and woman, and worshipp'd both
under the appellation of Lomus and Luna. Mithras, the
Persian deity, was both god and goddess, and the sexes of
Venus and Vulcan are very dubious: whence, in the invo-
culation 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 rep-
resented, on medals, naked. The imagination, it was sup-
pofed, must be sav'd, and kept from taking liberties, by
the consideration of the divine character.

G O D E A U, ASTRIDY, in Biography, was born at the
city of Dreux in the year 1625. 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 eblam'd the French academy of
belles letters. This society suggetted to the cardinal
Richelieu the foundation of the French academy, of which M. Godau was an original member. He took orders in
the year 1735; and having enriched his own mind with the
knowledge 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
bishops of Grafs, and from this time he divided his time
between his studies, and the diligent discharge of his episcopat functions. He found the state of ecclesiastical discipline exceedingly relaxed, and fell about its reformation; he
personally examined the qualifications of the clergy, and
enquired in what manner they discharg'd the important
duties of their office; he frequently preached in different
parts of his diocese, and exhibited in his own life an admi-
able model of those virtues which he was anxious to re-
commemorate 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 Grafs, but
when he found that the people and clergy opposed the mea-
sure, he chose rather to give up his pretentions, than break
in upon the peace of the church. He died in 1672, at the
age of sixty-seven years. He was a considerable 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 ecle-
siastical history written in the French language; and though
composed with less precision than that of the Abbé Freuxy; it
possesses considerable merit. It is characterized by Dupin
as “exact, faithful and agreeable;” he further adds, that
always will have a merit, which neither time, nor any other
history will be able to efface. Besides the history, we may
notice M. Godau's “Paraphrases on the Epistles of St.
“The lives of St. Paul, St. Augustine, and St. Charles
Borromeo, &c.” Moreni.

G D E F R O I, D E N Y S, 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
counsellor's place. In 1580 his religious principles obliged
him to seek a refuge at Geneva, where he was admitted a
burgher, and a professor of the law. In 1580 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 Strafburg. In 1604, at the invitation of Frede-
rick, elector-palatine, he went to settle at Heidelberg, and in
1618 that prince lent him on an embassy to Lewis XIII.,
who received him with marks of high esteem. He died at
Straburg 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, “Codex Juris civilis ex antiquis et recentioribus
scriptoribus;” this treatise has been frequently reprinted; the best edition is paid
be to that from the Elzevir press in two volumes folio.

“Note in IV. Libros Institutionum;” “Praxis Civilis ex
antiquis et recentioribus Scriptoribus.”

G D E F R O I, THEODORE, the eldest son of the preceding,
was born at Geneva in 1582. He pursued his studies first
in
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 last half 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 as "Le Ceremonial de France," 4to. "Mem. concernant l'Annexion des Rois de France sur les Rois d'Espagne," "De la veritable Origine de la Maison d'Auvergne," "Traite touchant les Droits du Roi, tres-chretien fur plusieurs Etats voisines," &c. Moreri.

GODEFROI, James, brother to Theodore, was born at Geneva in 1537. 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 1560 he was created professor of the law at Geneva, and was called to a seat in the council in 1569. 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 negociations in France, Piedmont, Switserland, 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 1572, and his works bear testimony to his profound erudition, and to his great and unwearied industry; among them may be mentioned "Fragmenta Dodecim Tabularum," "Animadversiones Juris Civilis," "De Jure Precedentiarium," "Codex Theodonianus," a posthumous 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 Spire. Moreni.

GODEFROI, Denis, son of Theodore, born at Paris in 1515, was an able French historian. He was author of "Memoires et Instructions pour servir dans les Negociations 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 many of his father's works, adding to them new illustrations with learned notes. He continued to his own time Feron's "Histoire 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. Moreni.

GODEFROI, 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. Moreni.

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 Montmartier. The place contains 670, and the canton 15,359 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; hence he proceeded to Pannonia and Dalmatia, where he commenced preaching the doctrine of predetermination with much fervor, which it is supposed he imbibed from the works of St. Augustine. Upon his return to his own country he had a conference with Nothingus, bishop of Verona, before whom he maintained that God, from all eternity, had pre-ordained some to everlasting life, and others to everlasting punishment and misery. Nothingus, astonished and terrified at this daring, and, as he thought, impious a position, complained of it to Rabanus, archbishop of Mentz, who undertook to refute his error, in writing. Difficulties, perhaps, with his own arguments, Rabanus summoned a council to meet at Mentz, in the year 848, to which, however, Godeschalke presented a justification of his opinions, and resolutely persisted in maintaining them to be consistent with the scriptures and the sense 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 the monk was a second time condemned, and rendered liable to a punishment repugnant to all the principles of religion and humanity. Godeschalke, however erroneous his sentiments might be, was not to be intimidated; he believed what he alleged, 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 pain inflicted on him obliged him, in compliance with the dictates of his prudent, 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 to the prison of Hautvilliers, in the diocese of Rheims. In this, as in every other case of a similar kind, the sufferings of Godeschalke 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 Quiercy. Here the suffering monk was again condemned, but the decrees of this council were declared null and void, and Godeschalke 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 Tourn. Such was the origin of the disputes concerning the doctrines of predetermination and grace, which, from time to time, have divided the Catholic world into two parties, and which have subsisted in full force among the Protestants. The unfortunate Godeschalke died in prison about the year 869, 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 "Controversiae de Fide," inferred in archbishop Ulfer's "Hiscoria Godeschalch," printed at Dublin in 1644; an epitola to Rutmanus, published in Celio's "Hiscoria Godeschalch," at Paris, in 1655; and some fragments of other pieces, noticed by Uvar. Godeschalke has immortalized his name by setting on foot the controversy.
God

controversy to which we have referred, and by his sufferings in vindication of his favourite doctrine. In the year 1650, the celebrated Magini published at Paris, in two volumes 4to, a collection of the early treatises produced on both sides of this controversy, entitled "Veterni Auctorum qui nono Ante Baptem de Predestinatione et Gratia peripferant, &c."

GOD-FATHERS, 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 ponsors, 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 divines 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 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 at issue 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 godfather 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 will 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 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 imposition 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.) "1 cannot determine, unless the negative may be conjectured from Justin Martyr, Tertullian's senior by 50 years, who, when he enumerates the method and form of baptism, says not one word of sponsors or godfathers, as may be seen in his second apology, p. 553, 54.) St. Austin, one of the earliest of Christian writers who mention sponsors, who lived about A.D. 390, 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-sons 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, whose parents have cruelly exposed, to be brought up by those who light on them, are now, and then, and taken up by the holy virgins, 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 confesses, (Hist. Inf. Bap. 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 that the practice be not enforced as a Christian institution, and as absolutely indispensable, the divines, we conceive, could not reasonably object to it. Mr. Wheatly, a well-known writer on the Common Prayer, observes, that the godfathers and god-mothers of persons baptized at riper years "are only appointed as witnesses of the engagement, and undertake no more than to remind them hereafter of the vows and profession, which they made in their presence." And yet our church catechism expressly affirms, and repeats the affection, 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 godfathers 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 godfathers and god-mothers at their confirmation. They even give god-fathers, &c. to bells, 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 fort of godfathers: 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 seconds, who attended and assisted the knights in tournaments, or single combats.

The godfathers of dukes 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 quadrell. See Quadrell.

The institution of godfathers and god-mothers, patrini and matrini, is originally Roman. They are said to have been people who, in the games of the Circus, attended the chariots, flowers, and images, of the gods. Cicero makes mention of them, in his oration De Haruspiciis Repofpin. Their office was much like that of the children in some Roman ceremonies, who are drest in the habit of angels, to draw 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 valour and fidelity, conferred upon him the title of duke of Lorraine. 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 disinterestedness of his conduct, by sacrificing 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 abate from those acts of hostility and rapine which characterized, and had caused the destruction of the fanatics of Peter the Hermit. It was not until June 1199, 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 13th 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, his 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 enigmas of royalty in the place where Christ, in whose name 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 Assize of Jerusalem," gave a model of the purest forms of European liberty in the midst of Asiatic despotism. He died, after he had fat on the throne about a year, and was succeeded by his brother Baldwin. The celebrity of Godfrey is immaterial 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 fide, or 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 valour was matured by prudence and moderation; his piety, though blind, was sincere, and in the tumult of a camp he practised the real and fictitious virtues of a convent. Superior to the private fictions of the chiefs, he revered his enmity for the enemies of Christ; and though he gained a kingdom by the attempt, his pure and disinterested zeal was acknowledged by his rivals."—Gibbon Univer. Hist. See also the article Crusade.

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 the events of his own time. It was first printed at Basil in 1559; then at Frankfort in 1583, and afterwards at Hanover in 1613; in the collection of German historians, edited by Pillorius. Godfrey was author of a work intitled "Speculum Regnum, five de Genealogia omnium Regnum;" the MS. is preserved in the Imperial library of Vienna.

God-Gild, in our Ancient Customs, that which is offered to God, or for his service.
GOD

The league of God's house is divided into 11 high jurisdictions, and comprehends 21 communes.

1. Coire
2. Sopra Porta
3. Sotto Porta
4. Sopra Fontana Merla
5. Sotto Fontana Merla
6. Sopra Tafina
7. Sotto Tafina
8. Bivio and Marmorara
9. Avers
10. Remus, Schins, and Samun
11. Ortenstein
12. Turfleina
13. Obervats
14. Beguins
15. Tenzen and Reamp
16. Tiefen Caffien
17. Valley of Pufchiavo
18. Valley of Munfler
19. Sitzers, Igis, Tremes
20. Unter Vatz
21. Panoramatic

God's Mercy, Islands of, three or four small islands at the N.W. extremity of Hudson's straits. N. lat. 63° 45'. W. long. 73°.

Godwin, Earl, in Biography, a powerful Saxon baron, was the son of Wulfnoth, governor of Suffolk, and he himself, at the accession 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 close of 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 vassals of Godwin. In the reign of Hardicanute the surviving prince Edward preferred an accusation 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 galley finely gilt and decorated, rowed by four score men, each of whom wore on his arm a gold bracelet, weighing sixteen 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 of Wessex, 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 thedukes of Northum-
GODWIN.

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 post, which was probably attended with little emolument, he filled eighteen years, with very high reputation, during which he received no preferment in the church; but, in 1564, he was promoted to the deenery of Christchurch, Oxford, and in the same year a prebend was conferred on him. In 1566, he was advanced to the deenery 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 fee of Bath and Wells. This honour did not augment the happiness of Dr. Godwin: in resettling the unjust claims of one of Elizabeth's favourites, he lost the favour of the queen herself, which aficioned 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 sunk under the effects of disease, in his seventy-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 Haddington, in Northamptonshire, in the year 1561, and having been carefully educated in grammar, he was sent to Christ-church college, Oxford, where he resided for his first six years, and in 1578 he was elected a scholar of that institution. In 1580, 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 sentiments 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 Gonzales." 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 deenbury 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 possession 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 far 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 fee 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 Britains unto the Christian Religion. It was afterwards republished in Latin, under the title of "De Pre-fulibus Anglicis Commentarius." In the same year he published "Rerum Anglicarum Henrici VIII., Edvardo VI., et Mariae, regnantis, Annalcs," which was much admired for the elegance of the style. By King James he was translated from Landaff to the bishopric of Hereford in the year 1619, 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 several methods of conveying secret and speedy intelligence, with the title of "Nuncius Imnatus, Utopia." It has been suggested that this was written in obscure 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 Annals, and a translation into English of the same work, we have a learned dissertation by the bishop, on the value of the Roman fable and attic 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-sixth 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 the English language, 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 lawyer; 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 Somerfetshire in the year 1564. In his fifteenth year, he was sent to the grammar-school at 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 affability in forming good scholars, who afterwards became eminent in various departments of literature, and in poets of honour and emolument in the church and state. In 1613 he published "Romane Histories Anthologiæ," 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 1615 he was admitted to the degree of bachelor of divinity, and published a work, entitled "Synopsis Antiquitatum Hebraicarum ad Explicationem utriusque Talmudis Valde necessaria," &c. lib. 3. 4to. 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. "Moses and Aaron; civil and ecclesiastical 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 academic education, and has been repeatedly printed. In 1656 Mr. Godwin was admitted to the degree of doctor of divinity. He died..."
in 1642. Besides the works already noticed, Dr. Godwin was the author of "Florilegium Paralipomenon,"—or A Survey of the Latin Tongue. And Three Arguments to prove election upon the ground of faith. Gen. Dig.

Godwin, in Geography, in Geography, in Geography, in Geography, in Geography, a bank in the sea, about five miles from Dool, near the coast of Kent, England, were formerly part of the estate of the celebrated earl Godwin, but were separated 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 is it 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 end-head being nearly opposite to Ramigate, and the south end-head to Kingdown. The danger of flitting upon them arises from their nature, which Mr. Shaw describes as that of a quick-flood, clean and unconnected, yet lying so close, as to render it difficult to work a pointed bar to the depth of more than six 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 seem 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 leaven the name of the Jamaica island. Some years ago, in order to prevent the many accidents which occur in 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 SCOLOPAX AGNEEPhala.

GODWIT, Great, of American. See SCOLOPAX FEDO.

GODWIT, Lesser. See SCOLOPAX LAMPA.

GODWIT, Red. See SCOLOPAX LAPPONICA.

GODWIT, White. See Recurvirostra Alta.

GOELANS, Point Au, in Geography, a promontory on the N. side of lake Ontario; about 33 miles S. W. of fort Frontine.

GOELHEIM, a town of France, in the department of Montélimar, and chief place of a canton, in the district of Kaiferlautern. The place contains 800, and the canton 4999 inhabitants, in 16 communes.

GOELICKE, Andrew, in Biography, a German physician, who acquired considerable reputation at the beginning of the eighteenth century, and taught the science of medicine at Halle, in Saxony, and at Franckfort 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 "Histoire Medicinale Universelle, qui celebrorum quorumque Medicorum, qui a primitis Artis natalibus ad nostra usque tempora inclamerunt, viae, nomina, dogmata singulare, ratiociniis, hypotheseis, facta, &c. accuratissime pertractata," 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, according to his, was divided into three professions. Ebor. D. It.

GOELL, in Geography, an island of Denmark, in Lymford gulf, about 10 miles in circumference; on which are a town and a village of two; 6 miles W. of Aalborg. N. lat. 57° 5'. E. long. 9° 49'.

GOELMA, a port of Egypt, in the Red sea, capable of accommodating only small vessels.

GOELWARA, a cove of Hindostan, in Guzerat, on the W. coast of the gulf of Cambay.

GOEREEL, William, in Biography, who flourished in the 17th century, was born at Middleburg, in Zealand, in the year 1655. 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 step-father, 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 book-seller, as that which he imagined best adapted for the improvement of his leisure hours in the acquisition of knowledge. His various works will show how well he filled his time, and to what advantage he turned those intervals from occupation, which are too frequently spent in little-kisses 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 some other useful works. More.

GOERZEL GHEEZEK, in Geography, a town of Asiatic Turkey, in Notola; 25 miles S. of Smbb.

GOES, a town of Portugal, in the province of Beira; 9 miles E. of Coimbra.—Alto, a town of Holland, in Zealand, called "Ter-Goes," situated on the N. coast of the island of South Beveland, 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; 10 miles E. of Flushing. N. lat. 51° 33'. E. long. 4° 46'.

GOETIA, Goezia, a species of magic, opposed to Theurgia, the object of which was mischief; and accordingly it invoked only the malevolent genii.

GOEZ, DAMIAN, in Biography, a learned Portuguese, of the 16th century, was born at Alencer, 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 some years under Buonamico, and contracted a friendship in Italy with Benmo, 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 von Roffen. He was, however, seized by the enemy, under the pretext of a violation of the truce, and obliged to return him. 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 in so confused a state, and so scanty in regard to quantity, that he was able to perform but a small part of the task. He was malignant, accused, arrested, and thrown into prison. At length, as there was nothing found against him, he was liberated, and returned.
ed to his own dwellings, where he was shortly after found burnt to death, the confederacy, probably, of an apoplectic fit. His works are, "Legatio magi in Domum Emperor ad Emanualem Lateinian Regem," "Fides, Religionis, Mor" "Ethiopiam," "Etyphonii Laudent." "Iuris Lanovanii Obfudio," "Commentarii Gebrarum in Judic. Lateinian." "Urbanii Syllophonii Decriptio," "Historia del rey Dom. Manuel," "Chronica de Principe D. Jusas II." Moreri.

GOEZE, JOHN AUGUSTUS EMBLEM, was born at Alchiper in the year 1731, 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 Quedlinburg, 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 famous. At first he made use of his microscope only for amusement, but in a short time he perfected himself of the very best instruments of the kind that had been manufactured, and his researches led him to the study of the natural history of insects. Baker's description of a certain insect which he described to explore the ditches, rivulets, and ponds. He wrote down his observations for his own private use, and caused many of the objects which he saw to be delineated. The facts thus collected he published in the Hannoverian magazine, which attracted the notice of the learned, from whom he received many flattering and highly complimentary letters on the subject. He translated Buffalo's treatise on insectology, which met with a very favourable reception from naturalists. He felt out without regard to style 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 naturalist. The next considerable work of Goede 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 dilettomists 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 professors in general, and being a very agreeable as well as learned writer, his productions were all well received, and to his honour it must be spoken that he never forgot to inculcate the duties of religion and morality while he was defending on the wonders of the natural world. After he had communicated to the public the result of his observations on intestinal worms, he sent his collection to Pavia, where it was sold for a thousand dollars. His fame, however, had extended much beyond his own country, and within a very 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 fun for it. He died in June 1786.


GOFABAD, in Geography, a town of Persia, in the province of Irak: 55 miles E. of Isphahan.

COFFEE. See GEFF.

GOFFSTOWN, a town of America, in Hillsborough county, New Hampshire, situated on the western bank of Merrimac river, 3 miles from Amoskeag falls, or 60 miles W. of Portsmouth. It was incorporated in 1761, and contains 1612 inhabitants.

GOG and Magog. In Scripture History, are names given to Great Tribulation. They are connected in the sacred writings. (See Ezek. xxxviii. 2, 3, &c. xxxix. 1, 2, Rev. xx. 8.) Mofes (Gen. x. 2) speaks of Magog, the son of Japheth, but says nothing of Gog. According to Ezekiel, (ibid. 27) 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 Gog; and to these purpose people have been found there called Magians, and philosophers called Magi 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 those 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 אָגָּם, gog-casus, the desert of Gog. He also says, that Promethus, kid to be chained to Caucasus, is Gog; and it may be observed, that there is a province in Iberia S. of Caucasus, called the Gogarens. The Jews, in Scripture, 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 Carbyces, king of Peris, were the same persons. The Arabian historians are of opinion that the descendants 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 Arabs, 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-MOGG Hills, in Geography, hills so called, about three miles from Cambridge, remarkable for the interments and other works found there, and supposed by some to be a Roman camp, and by others, a work of the Danes.

GOGA, a town of Abyssinia: 30 miles S. of Gendar — also, a small town of India, on the western side of the gulf of Cambaya, about 28 or 30 leagues from Cambaya, abounding with hians and feamen.

GOGARDE, a town of Sweden, in Est. Gotland, 23 miles N.N.W. of Linkoping.

GOGARENA, in Antiqu Geography, a country of Asia, in Armenia. Strabo.

GOGARY, in Geography, a town of Bengal: 24 miles N.W. of Boghniar. N. lat. 25° 26'. E. long. 86° 30'. — also, a town of Hindoostan, in Bhar; 12 miles N. of Monghir.

GOGAVINUS, ANTONIUS GRAVINUS, an Antonius GOGAVIN DE GRAVE, in Biography, a learned writer, who, according to the informations of the famous Farlisse, published in corps all the ancient authors on music, at Venice, 1562, 410. His compilation contains the books of Aristoxenus and Ptolemy, and the fragment of Aristoil, with the Commentary of Peripty., the whole enriched with notes by Botugrand. See MEHUNUS, and BOTUGRAND.

GOGET, in lzbolology. See GENTIS ANON.

GOGGLES, in Rural Economy, a paired effection in 3G. see.
GOGO

sheep, which is sometimes extremely destructive to them. It is faggotted in the Bath papers as first shewing 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 turn round as in that disease. It appears to have the greatest resemblance to the disorder called the faggots in lambs; but differs from it, as that the faggots lambs display weakness before, and of course fall in that direction, while the gogho sheep show weakness 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 limbs after them, and consequently die. Some have contended that it is a disease of the paralytic kind, and that the seat of the complaint is in the spinal marrow. It was formerly either wholly unknown, or unattended to by sheep-farmers, as it is never mentioned.

Hitherto no satisfactory method of cure has been pointed out for the disease, but warmth and frequent change of pasture have been found beneficial in it.

Goggles, in Surgery, are instruments used for curing squinting, or that distorsion of the eyes which occasions this disorder. They are short 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. Warne on the Eye, p. 32.

GOGOMOW, in Geography, a town of Hindoostan, in Ouda; 55 miles N. of Maniapour.

GOGO. 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 Nonnagur.

GOGRA, also called Dewah and Soorjeaw, a river of Hindoostan, which proceeds from a lake named Lakedehe, having to the E. of it another larger lake, named Manfawar, both situated on the western side of Thibet, and forces its way through the valley called Himimalch, and afterwards joins the Ganges. See Dewah.

GOGUEET, Anthony-Yves, in Biography, was born at Paris in 1716, where his father was an advocate. He himself became a counsellor to the parlement. By close study and by great affability in his manners, 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 "Origine des Loix, des Arts, des Sciences, et de leur Progres chez les anciens Peuples," in three volumes 4to. It was printed in 1778, in six volumes 12mo. 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, thoroughness 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.

GOHANNA, in Geography, a town of Hindoostan, in Ballogiliana; 54 miles W.S.W. of Delhi.

GOHEE, a town of Hindoostan, in Balhar; 35 miles W.N.W. of Safaran.

GOHUB, a city of Hindoostan, in the foubah of Agra, lying on the right side of the river Jumna. It is bounded on the N. by the Chambal, on the E. by Doob and Ouda, on the S. by Bambol, and on the W. by Rantampour and Cottah--Alfoo, a town of this circuit, 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° 14'.

GOJAK, a town of Croatia, on the river Mespiltsza; 18 miles S. of Carlstadt.

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 these 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 largest in the high parts of Abyssinia. The country is populous, but the men are in the lowest elimination as soldiers. The Jefuits were settled in many convents throughout the province, and are held in the utmost detestation. The monks are those of St. Entitius, 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 Gojas.

GOJAV, a town of Africa, on the Grain coast; 25 miles S. E. of Grand Sello.

GOJEIDA, or Gojida, a town of Algiers; 90 miles S.E. of Oran.

GOING, in the Manges, called in French allaire, is the pace or gait of a horse.

GÖIT, Curt, Garl, Leat, &c. are names for a ditch or trench for conveying water, used by engineers and miners of different districts.

GOITO, in Geography, a part 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.

Performs labouring under this complaint are found in various mountainous districts of Europe, in China, in Bootan, and many other regions of the East, in Sumatra, &c. (SeeCREFINS.) Turner, in his "Account of an Embassy to Tibet," says, that in Bengal this unfortunately is known by the name of "Gheig," and "Aubi," and in Bootan is called "Baj," or "Ke Baj," 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 Morung, Njal, and Almora hills, which, joined to those of Bootan, run 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 Affnam, N. lat. 27° E. long. 91°, it is to be traced through Bijiee, Goocch Bahar, Rungpare, Dinagopore, Parma, Tircoot, and Betain, along
GOL

along the northern boundary of Oude, in Gooracpor, Barra-
raich, Pillibub, and on the confines of Rohilkund, to Hur-
dewar, situated in N. lat. 30°. E. long. 78° 25'. 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. Maric, in
his "History of Sumatra," observes, that it has been usual to
attribute this affection to the baddafs, thawed slate, mineral
quality, or other peculiarity of the waters: "My ex-
perience," he adds; "enables me to pronounce without hesi-
tation, that the disorder, for such it is, though it appears
here to mark a distinct race of people, (orang geonong,) is
immediately connected with the hill-sides 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 conjec-
ture that has been adopted concerning the alpino 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 vallies, between the high mountains, where, and not
on the summits, the natives of these parts reside. I before
remarked, that between the ranges of the hills, the "ca-
boat," or dense mist, is visible for several hours every
morning; rising in a thick, opaque, and well-defined body,
with the fun, and feldom quite dispersed till afternoon.
This phenomenon, as well as that of the vlogs, being peculi-
ar to the regions of the hills, affords a premonition that
they may be connected; exclusive of the natural probabili-
ty that a cold vapour, clouds, to an uncommon degree, and
continually enveloping the habitations, should affect with
the fumes of the habitants. I cannot pretend to say how far
this solution may apply to the case of the goi-
tres, but I recollect it to have been mentioned, that the
only method of curing these people is by removing them
from the vallies to the clear and pure air on the tops of
the hills; which seems to indicate a fimilar fource of the dif-
temper with what I have pointed out. The Sumatrans do
not appear to attempt any remedy for it, the vlogs being
confident with the highest health in other respects."

GOKAUX, in Geography, a town of Hindooftan, in
Vifapour; 16 miles S.E. of Raiboung.

GOKIA, a town of Turkih Armenia; 30 miles E.S.E.
of Akadizik.

GOLABAD, a town of Persia, in the province of Irak;
45 m. E. of Ifppahan.

GOLAH, a town of Hindooftan, in Bahar; 10 miles
E. of Ramgur.

GOLAN, a town of the duchy of Waffaw; 10 miles
N.E. of Pofen.

GOLAPILLY, a town of Hindooftan, in the eircar of
Gif-toor; 10 miles W. of Lanneouka.

GOLAWARRY, a town of Bengal; 48 miles N.W.
of Midnapour.

GOLCONDA, a province of Hindooftan, part of the
posseffion of the Nizam, or Soubaah of the Deccan, our
from ally, corresponds to the ancient province of Telingana,
Teling, situated between the lower parts of the cour-
tries of the Kilinah and Godavery rivers; and is bounded on
the N. by Berar, on the E. by the Circars, on the S. by the
Myficorn country and the Carnatic, and on the W. by Dow-
kabad and Vifapour. It takes its name from a famous
fortrefs. 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 provisons, 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 Augu-
ust, September, and October, the rains again fall, and very
much swell the rivers. These rains render the land excessively
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 fortresses, surrounded by
stone walls and deep ditches, which was formerly the refe-
dence of the kings of the country. This fortresses, on ac-
count 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 fortresses was taken by
treachery; the king offered to pay a tribut of 3,700,000
rupees, and become the vallal of the conqueror; but he re-
fused, and entered the palace in triumph.

GOLD. Gold, Gerin.; Gold, Swed. Dan.; Or, Fr.;
Arany, Hung.; Salofo, Ruff.

Mineralogical Description.—This metal never having been
found in a mineralized slate, we are acquainted with one spe-
cies only, namely,

Native gold, which is subdivided by Werner into three sub-
species, viz. gold-yellow, brown-yellow, and greyish-yellow gold.
Though this subdivision may appear arbitrary, and not found-
ed on conflant 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 clasification of earthy foils, constitutes a character of
considerable value in native metallic subfiances, the range of
whole colours is confined to a narrow compass. But
also their geographic relation appears to culminate a dis-
tinction, at least between the two first of the Wernern
sub-species; for as to the third, or the greyish-yellow gold,
it is not known if it is its being found in small flat parti-
cles, along with that mixture of different metals called pla-
tina in grains, of whose colour it partakes in general, and
with which it is supposed to have occurred also originally
under the same geographic relations.

1. Light or Brown-coloured native Gold. Meetting-yellow ge-
gen gold of Werner. Its colour is pretty well indicated by
its name; but it varies in intensity from what may be called
pale-yellow to yellowish-silver white. It is also some-
times found with deep-yellow, and with pavonine tarnish.

It occurs malleable, disseminated in angular and amorphous
particles, but more frequently in films, membranes, and plates
even and curved or twisted, and with smooth or drused sur-
face; also capillary, tooth and wire-shaped, shrub and fern-
like, and as monoliform rings; 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 following secondary forms have been observed: the
cube; the octahedron; the garnet-dodecahedron; the lutei-
ci-dodecahedron with trapezoidal planes. 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 dropt the membrane, and the simple triangular marks on the plates of the Transylvania 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. Eimmart as octahedra and cubes of two lines in diameter, have never before been heard of); their surface is always smooth.

Lustrous metallic; externally brilliant; while that of the grains is sometimes glistening, sometimes approaching to dull; internally it is glimmering and glistening.

The fracture of gold is fine hackly. Its fragments are indeterminate angular.

It is soft, highly flexible, malleable, and ductile.

The specific gravity of pure gold is from 19.353 to 19.640; but that of the brass-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 brass-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 infrequently with grey antimony. Other concomitant substances are, among the earthy fossils, calcareous spar, brown spar, barytes, feldspar, and seldom small quantities of bole, lathmomar, and common garnet; of metallic substances, red and vitreous silver ores; (feldspar native silver,) copper pyrites, grey copper ore, copper green, brown iron stone, 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-gelbes gelegen-gold of Werner.

Its colour is the highest gold-colour, feldspar gathering on brass yellow.

It occurs massive and in small roundish and flattened pieces, as also in grains of various dimensions, detached or disintegrated; feldspar in particular external forms, such as in leaves and lamine, fibrolite and moflikite; scarcely ever crystallized: almost all the crystalline forms described by authors belonging to the light-coloured sub-species.

External luster glistening, sometimes (as in the variety called Spanish infus) divided of all luster. 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 bed of rivers, and as such, appears to have been originally disintegrated in rocks of ancient formation: it is, however, also found in veins in Norway, Siberia, Bohemia, Hungary, in the Earl Indies, &c., almost always disintegrated in quartz, accompanied by iron pyrites; but nothing is as yet known respecting the age of these veins. At Fatzebay it is found in minutely moflikite external forms, often of a dull powdery appearance, on common quartz sometimes mixed with iron pyrites; in this slate it is by the miner called Spanish infus.

Geographical situation.—The following localities comprise head 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 brass-yellow sub-species, except the gold of rivers and alluvial soil, which is principally deep yellow, and to which the immense quantities of this precious metal, tarnished by the other parts of the world, appear likewise to be referable.

Europe:—Hungary, the Banat, and principally Transylvania. In Upper Hungary it occurs in gneis: at Schen-itz, in Lower Hungary, it is found accompanied with several silver ores, and with galena; at Kemenitz, in and on cellular and flattened quartz, lamellar barytes, with vitreous silver and grey copper ore, copper pyrites, brown spar, &c. at Oravizza, in the Banat, it occurs silifom and diffuminated in pale flecked and greenish-white fom, 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-porphyry of different degrees of freehense, which is the Saxon metaliferous of Born, in greywacke and greywacke slate: at Kapnik it is sometimes found with red orpiment; at Stanfia in calcar-ous fpar, mixed with arsenical pyrites, &c.: other places of Transylvania aboundling in gold (which is for the greater part brass-yellow), are Verebapatik, Abrabdaya, Boiza, Oblenbaya, Fatzebay, Topilza, Treffyam, &c. Alto the rivers, both of Hungary and Transylvania, are richly auriferous; gold sand is found in the Nera, and underneath a stratum of clay on the plain traversed by this river. The richest river of Transylvania is the Armoni, and the plains bordering on the river Mohor, contains likewise gold in grins, between a stratum of mud, and another of schists, neither of which strata is in the least auriferous. Alto of Olapian, gold is obtained by washing; it is there mixed with magnetic iron stone, titanium, garnet, and cyanite. The gold of the great rivers of Transylvania is generally of 21 carats, that of Olapian and Rohnia is even of 23 carats, fix grans.

In Germany it is found in several places, at Johangeorgenflad in Saxony, in Caritania, where it accompanies copper ores, in Tyrol and Salzburg; but it is only in the half of the districts, or rather in the chain of mountains, separating Tyrol from Caritania, that gold-mines are worked: in the Zillerthal it is found in various external forms, and accompanied with iron pyrites, &c. in the Heine slate. 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 Phocicians, after whom the Romans undertook to work them; and Pliny informs us, that those nations derived their great profit from them. Africa was the province which furnished most of this metal. After the discovery of America these mines were entirely given up and left. 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 Oyon, in the present department of the Iere: 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 lots amounted to upwards of 21,000 livres. It occurs there, with rock crystals and iron pyrites, in gneis. The sand of several rivers of France is auriferous, such as that of the Arriane near Mirepoix, the Gardon and Cesse in the Cevennes, the Rhone in the Pays de Gen, the Rhine between Strausburg and Philippsburg, the Salz in the neighbourhood of St. Giron, in the Pyrenees, the Garonne near Toulouse, and the Herault at Montpellier. Also most of the black sand and of the bog-iron found in the neighbourhood of Paris is said 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...
G O L D.

and where this takes place, grupp, or reefs, are found which contain the greatest proportion of gold. The proprietor of these mines extracted out of such reefs, 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 proprietors still possess 86 mills, by which from 10 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 Andes, in Peru, between mount Rupa and the valley of Aosta, such as the Avenfon, which runs from the valley of Chialant into the Daire, and where some gold-mines were also worked by the Romans; the Ore, &c.

Sweden has a gold mine at Edelfors in Smoland: the gangue, a brownish quartz, is said to be in a kind of hornblende slate, which also contains the metal differentiated.

Gold has also been found in Great Britain: in Cornwall; at Lead-hills, in Scotland, differentiated in quartz; at Wicklow, in Ireland, under the soil, and in a stream which runs over rocks of chaly-flake with veins of quartz. It belongs to the deep yellow variety.

Africa.—The gold-sores of Siberia are partly of the light coloured, but principally of the deep coloured variety: that of Berezof, which occurs in pyrites, or rather brown iron stone, and iron flint 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 spangles on hornflcle, found in one of the silver mines of Schlangenberg.

The geognostic relation of the gold found in several parts of India, in Japan, the Philippine and Maldives 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 geognostic habits. Though the commerce of gold-powder extends almost over the whole of Africa, yet, according to Heeren, there is none to be found in its northern parts. Among the principal African gold mines are those of Kordofen, between Darfur and Abyssinia, mentioned by Browne. The ancients, says Brongniart, appear to have been acquainted with these mines: they confedered 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 Zabra, in the well of Africa, at the foot of those lofty ridges of mountains on which originate, among many smaller rivers, the Senegal, the Gambier, and Niger. The country of Bambouk, at the N.E. of those mountains, is, according to Golbery, that which furnishes the greatest quantity of gold which is sold on the west coast of Africa, from the mouth of the Senegal to the Cape Palms. This gold is found in spangles 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 they find something like shafts, but without giving any support to the sides of the pits: 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 Zabra. The gold which is brought to Cairo and Alexandria from Sennaar comes likewise from thence. See Parke's travels, where also an interesting account is to be found of the gold in Manding, and of the process by which the negroes obtain it.

The third principal district of Africa, for collecting gold, is on the S.W. coast between 15° and 22° S. lat. opposite Madagascar. This gold comes principally from the country of Sofala. According to the relation of some travellers in this part of the world, the gold is found there not only in powder, but likewise in veins. Some are of opinion that the country of Ophir, from whence Solomon obtained gold, was situated on this coast.

America.—The gold of this part of the world, as far as we are acquainted with it, is to equally 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 most is 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 Caracas, 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 newest fels-trap formation. Almost all we know respecting the geognostic 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 differentiated in sand and other alluvial depositions, 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 2,000,000,000 of French livres; and, according to other authors, the amount is calculated to be 24,000,000 per annum. Brongniart, 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 "gray-yellow gold from Transylvania." The sub-division indium 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 indium-club; and that found in the sand of rivers to the peculiarised sub-species; and this not on account of their colour only, but also indicative of the chemical composition of the metal, but principally on account of the geognostic relation under which they respectively occur, and on which it appears to be laid by Werner.

2. Iron pyrites, containing not unfrequently a considerable portion of gold, in most cases invisibly disfigured and disguised, has by some been considered as a species of gold; a distinction to which (though such auriferous pyrites are often subject to mechanical treatment for extracting the metal, as will be seen hereafter) it cannot be considered as entitled. See Parke, Min. Afric.
The brown cubic crystals from Beresof, in Siberia, which contain grains of gold, are considered by some as decomposed, by others as hepatic pyrites, and by some as brown iron in foppollitions 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 incrusted, by particles of a pale yellow earthy substanee, which was considered by Hacquet as an oxys 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 specimens of native gold from Vereinipatak, but sometimes in such fine particles as to appear merely as a tint upon the metal. It is to this doubt probably that the gold ore, called Spanish snuff, owes its name, yellowish-brown colour. It deserves further examination.

4. The grey metallic substanee occurring as accicular indeterminate 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 siles to which it is applied, see the sequel of this article.

Extraction of Gold.—This metal is obtained separate from foreign substaneees, with which it is mixed by amalgamation with quicksilver. After it has been freed, by pounding and washing, from the flaky 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 confident, and which contains the chief part of the gold, remains. This is subjected to dilution, 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 dilute 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 confidential parts. The metal obtained in these ways is always more or less alloyed, particularly with silver and copper. The first layer 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 Quatation, 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 layer of Quatation is employed, which is so named on account of the proportion of materials 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. 2dly. 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 precluded together, and by these means favours the action of the acid.

The process recommended by Bergman is this: first to dissolve it in nitric-acetic acid; the silver is deposited spontaneously in the form of nitrate 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 Rouelle, exists in the vegetable kingdom, it having, in experiments intimated for the purpose, been extracted from the ashes 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 this place.

GOLD. Chemical Properties of.—Gold melts at the temperature of 32 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 hereafter shown, 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, the metal 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 undergo a kind of ebullition. This circumstance was noticed by Homberg and Macquer, as well in the application of the burning-glass, as when a small globule of the metal was acted on by the blow-pipe. Macquer asserts 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-glass invented by Tichurtheun, and which has been described under the article Burning-glass, Homberg found that gold, placed in its focus, not only rote in vapour, but that it was covered with a violet-coloured vitreous oxide. The experiment was frequently repeated, so as to ascertain the fact most 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 instances of real oxidation were, at first, regarded, by some who witnessed the experiment, as merely minute mechanical divisions of the metal, but this apparent objection has been removed by the experiments of Van Marum on the conductibility of gold by means of the large electrical machine at Harkem. A strong electric shock was passed through a gold 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 infide of houses,
Gold.

Phosphorus, or on the furniture which has been struck with lightning. The purple oxyd of gold, thus obtained, contains five or six percent 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 percent. 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 too weak, that it is scarcely affected by the greater number of acids. It was formerly supposed to be perfectly insoluble in the nitrous and nitric acids, which in general part with oxygen with so much facility, and when gold leaf is put into the acid cold, it seems to suffer 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 incomprehensible, and depends on so many conditions, which it is needless to enumerate, that the accuracy of the process of affaying 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 of 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, confining 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 phoshroric glafs, and an eighth part of charcoal. Part of the gold 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 sublimate may be decomposed by being kept in fussion; 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>
</tr>
<tr>
<td>Lead,</td>
<td>Arsenic,</td>
</tr>
<tr>
<td>Bismuth,</td>
<td>Fluoric,</td>
</tr>
<tr>
<td>Tin,</td>
<td>Tartaric,</td>
</tr>
<tr>
<td>Antimony,</td>
<td>Phosphoric,</td>
</tr>
<tr>
<td>Iron,</td>
<td>Prussic.</td>
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<tr>
<td>Platinum,</td>
<td></td>
</tr>
<tr>
<td>Zinc,</td>
<td></td>
</tr>
<tr>
<td>Nickel,</td>
<td></td>
</tr>
<tr>
<td>Arsenic,</td>
<td></td>
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<tr>
<td>Cobalt,</td>
<td></td>
</tr>
<tr>
<td>Manganese.</td>
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</table>

Sales 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 diffused to dryness, the gold is dissolved, and the solution attains 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 oxidated, 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, affumes 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 alkales, 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 intant of combination converts the orange-colour to a pure yellow.

2. Muriate of Gold.—Muriatic acid of itself has no action on gold, or on its purple oxyd, but gold is immediately oxidated and then diffused in oxymuriatic acid: or if nitric acid be added to the muriatic in certain proportions, the solution of gold in the mixture is readily effected: hence the nitro-muriatic 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 action of the chemical action is thus explained. Gold is oxidated with great difficulty, but it is effected by oxymuriatic acid, with 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 oxidated is diffused 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 astrincent metallic taste, 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 silicious 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 diffused, 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 sufficient to form a sufficient quantity of oxyd to entirely 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 sublimate, 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 diffused by the other acids when in its metallic state, but its oxyds 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 phosphpate 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 subject, we must not omit the experiments of Mrs. Fulhame, which she announced in an "Essay 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 with.
GOLD.

with a solution of muriate of gold, the salt is decomposed, and the gold, reduced to the metallic state, attaches itself to the silk. It is decomposed also by phosphorus. If a drop 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 yellow, vitreous layer, which may be separated by dissolving 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 sulphuric acid, a fine pecile 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 nitric-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 etheral solution is used by Mr. Stothart for defending lacets, and other surgical instruments, from injury by a moist atmosphere.

The muriate of gold is decomposed by all the alkalies 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 glass or enameled ware. This preparation is known to artists by the name of the "Purple powder of Caucasus," and it may be obtained by various processes. That which is commonly referred to, is to dissolve pure gold in a nitric-muriatic acid, which is composed of three parts of nitric and one of muriatic acid. A solution of tin is to be prepared by dissolving 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 subside, which is to be washed and dried. This is the only known preparation capable of giving a red colour to glass; and if the experiment be performed with accuracy and judgment, the glass so treated serves 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 oxys of tin and gold; and its formation is owing to the strong attraction of the tin for the oxygen, with which it is disposed to combine in large quantities. When the solutions, above described, are mixed, the oxyd of tin, which is nearly at the minimum of oxydization, attracts part of the oxygen of the oxyd of gold: the two oxys thus brought to states of oxydization, 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 the state of a nitre. The muriate of gold is decomposed by some other metallic 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 oxydization. Those which have a strong tendency to exist in such a state, are capable 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 heated in a crucible, 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 phusonc 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.

Alloy of Gold.—Gold forms alloys with the greater number of the metals, which produce on the metal so 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 coming, fuses more or less 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 iron, which is the standard proportion of alloy, and gradually decreasing to the state of a mass. The results drawn from the trials were, that fine gold, alloyed with silver, 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 scoria; 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. Cobalt. 7. Manganeze. 8. Nickel. 9. Tin. 10. Iron. 11. Platin. 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 1020; even the vapour arising from bismuth, lead, and antimony in fusion, produces these changes.
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 4th, 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 it an amalgam which will be deferred 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 shewn 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 facets easily of 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 1/4 part of silver, changes the colour of the gold very sensibly; and the alloy is employed for fordering gold, being more fusible than this metal.

**Gold. Physical 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 oxidizable by fusions in atmospheric air; nor is it acted upon by any of the acids, except the oxyymuriatic 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 fummary processes for exalting the colour of this noble metal. Other metals render it paler. The alchemists call gold, φό, the fun; 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, fulness, &c.

The weight of gold is to that of water, according to some statements, as 19.637 to 1000. Fine gold, immersed in water, weighs nearly one nineteenth part less than in air, and consequently it is upwards of 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 assigned; some have made it 19.637, others 19.643, and in the Swedish Translations 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. Ellicott, it does not appear to have exceeded 19.207; and from those of Dr. Lewis, on the purest gold, well hammered, its gravity is flattened between 19.320 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 very considerable than it has generally been found. But this effect 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 552, and consequently 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 184, and that of water one in 117; and the gravity of gold, weighed in the water, so warmed and expanded, should be greater than when the gold and water are 40 colder, in the proportion of about 19.265 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 weights, which are more than double in volume to an equal weight of gold, must be far influenced by the variable gravity of the atmosphere, that there must be an advantage in buying gold by weight when the air is lighter. But Dr. Lewis observes, that this difference appears too incensitive to be regarded in a commercial view. For the life of their los in water, as air is lighter than water; and air, if we admit the accuracy of the conclusion deduced from an experiment of Mr. Hawkshoe, being in its lightest state about a 937th, and in its heaviest state about a 848th part of the weight of water; it will be found, on calculation, that the gold preponderates above the brass, in the heaviest state more than in the lightest state, only by one part in 105,000, or one grain in about 300 ounces; which is a difference too minute to be sensible in the nicest balance. If the mean gravity of gold be reckoned 19.359, as a cubic inch of water weighs about 254 grains, a cubic inch of gold will consequently weigh about 4502 grains, or 10 ounces, 152 grains. The pound weight, or twelve ounces Troy, of gold, is divided into twenty-four carats. Dr. Lewis fixes the specific gravity of fine gold at 53 Fahrenheit, to be 19.359. According to Brillon the specific gravity of fine gold in ingot is 19.258, and when hammered 19.361. The specific gravity of gold made standard by British copper, was found by Mr. Hatchet (see Phil. Trans., for 1805) to be 17.281, when cast in an iron mould; but when the same was cast in gold, it was only 16.954. (See Specific Gravity.)

The softness of gold, for it is nearly as soft as tin, and its toughnels, adapt it for receiveing 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 slightly electricity and freezable. With regard to tenacity, it is inferior to iron, copper, platin, and silver, and therefore the alterations 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-leaf and Goldwire, which see. See also Ductility.

The value of gold to that of silver, was ancienly only as twelve to one. Indeed, this proportion varies as gold is more or less plentiful: for Systematic relates, that Cæsar brought such 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 to 1.
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in the year 1717, that in the mints of Spain and Portugal the value of gold is sixteen times that of silver; but that in those countries, payments in silver bearing generally a premium of six per cent. fixed by commercial statute, at 15; 1. to 1, that in the other parts of Europe, the value of gold is at most fifteen, and in China and Japan but nine or ten times that of silver; so that gold is rated higher in England than in any other part of Europe, and higher in Europe than in the Eastern countries. Hence, in great measure, arise the profits of exchanging gold for silver in one place, and re-exchanging them in another; and hence the greater disparity between the relative quantities of gold and silver in one commercial nation than in another; this metal being brought in most abundance which is rated highest in proportion to the other, and that which is rated lowest being drained away. There are various ways of determining the fineness of gold; or the proportion of alloy which it contains. Those who are averse to this business can judge nearly the proportion of alloy from the colour of any given mafs, provided that the species of alloy is known. For the method of doing this, see TOUCH-neddle.

The great excess of the weight of gold, above that of the metals used for its alloy, affords another method of determining the Quantity of alloy in any given mafs, where the species of alloy is known. Thus fine gold lofts in water one grain in every 19.3 nearly; and fine silver lofts one grain in about eleven; from whence it is easy to find the mafs of any number of grains of each, and consequently of any assignable mixture of the two metals. Thus, fifty grains of gold will loft above 2 1/2, and fifty grains of silver somewhat more than 4 1/4, so that a mixture of equal parts of the two will loft above seven in a hundred, or one in fourteen. A mixture of gold with half its weight of silver will loft one part in 15. 4; with a third of silver, one in 16. 2; with a fourth, one in 16. 7; and with an eleventh of silver, which is the standard proportion of alloy, one in 18. 1. On this principle, the specific gravity or proportional lofts in water, of gold alloyed with different quantities of silver, copper, and mixtures of both, may be computed and formed into tables for use. The accuracy of this method, it should be observed, depends on the supposition that each of the two metals, that are melted together, retains its own proper gravity, which is the case in mixtures of gold and silver; but gold and copper, melted together, are specifically lighter than if they were weighed separately; or the specific gravity of the alloy is less than that of the mean of its ingredients; the case is the same with the alloys of nickel and gold, of lead and gold, of iron and gold; but the reverse happens in mixtures of gold with zinc, bismuth, and tin. It appears, therefore, that the hydrostatic balance cannot discover, with certainty, the exact fineness of gold, unless when silver is the metal mixed with it.

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 paste made of powdered ful ammoniac mollified 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 ferrath 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 ferrath 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 plate thus moulded a little powdered sulphur; when the piece is made red-hot and quenched in water, the gold may be wiped off with a brush.

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 loosen it; then rub the wood in a little warm water, with short stiff 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 sixth of its weight of fine gold in thin plates that are hot; after this mixture has 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 gradually pressed till 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 filvery mafs, of the consistence of soft butter; when this mafs has been bruised in a mortar, or shaken in a phial, with repeated portions of salt and water, till the water receives no founfes from it, it is fit for use, and may be preserved 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 (nitrous red oxyd of mercury), either alone or mixed with a little charcoal powder. See AMALGAM and MERCURY.

GOLD-heating, and GOLD-heater's skin. See GOLD-leaf.

GOLD, Burnished, is that which is polished with a file 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 SPECIE of gold. See COIN and COINAGE.

GOLD COLOUR on GLASS and China. See CEMENTS, 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 lefs malleable, and approaches more or lefs 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 the compound is improved by a small mixture of some other metallic bodies. Cramer recommends the addition of a small quantity of pure tin to copper, melted with a fourth or fifth part of zinc, which forms a compound metal, that acquires, on being well cleaned, and laid in the air for some days, a superficial colour of fine gold. Geoffroy says that iron has the best effect: with the proportions of ten parts of zinc, eight of copper, and one of iron-filings, 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 brass, and then melting it with a suitable quantity of zinc, a metal may be obtained of fine period.
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perior quality to that produced either by melting the copper end zinc, or by impregnating the copper with zinc, by cementation and fusion with calamine; which is a method sometimes practised. A very ingenious artist, 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 with lead lots 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 tincture, with two of nitre, and one of borax, are directed to be mixed with oil to the consistence of paper, then melted in a crucible, and poured into a flat mould first well warmed. A composition of this kind is called aurum fabuliferum.

The following method is recommended by Homborg 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 river-water for two hours, then distill off the quicksilver in a retort, and coagulate it once; take out the copper and fuse it, and it will be founded 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 ashes, and four half ounces of copper; melt them well together in a cluse luted crucible, with a strong fire; or take one half ounce of the purest 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 Prior's Metal and Tommac.

Silver is tarnished superficially, by certain vapours, as that of putrid 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 silver and laces.

GOLD-coloured Pigments. See Pigments.


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 copper-plates, 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, Farring of. See Farring.

Gold, Fine or Pure, is that purged by the fire of all its impurities, and all alloy. The Latins call it aurum purum, aurum primam, aurum obirizum, aurum calidum.

The moderns frequently call it gold of twenty-four carats; but, in reality, there is no such thing as gold so 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.

Bouteron maintains, 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 of France, it appears that the gold then struck at Paris was of nineteen carats one-fifth; and yet it is added that it was the best and finest gold then known on earth. See Standard.

Gold, Fulminating, aurum fulminans, a precipitate of gold from its nitro-muriatic solution by ammonia, which possesses a most remarkable explosive property. See Ammonia.

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 presently explodes with a very loud report. This powder should be very cautiously used; the temperature requisite for its explosion is flattened at above 250° of Fahrenheit. Before it explodes, its yellow colour changes to black, and at the moment of its decomposition an inustaneous flash is observed. The principal energy in explosions are directed downwards, insomuch that two or three grains of it exploded on a moderately thick sheet of copper will burn a hole in it. This salt 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-hopper bottle. The facility of its explosion is very much increased by high 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 fulpeat of potash, or with any pulverulent substance neither fusible nor 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 salt when decomposed in close vessels was reduced to gold, partly in the metallic state and partly in that of purple oxyd, and at the same time a gas was extracted in bulk about a thousand times as great as that of the original fulminating salt, 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 gold.
Gold, Leaf, or beaten gold, is gold beaten with a hammer into exceedingly thin leaves. It is astonishing to consider the fineness 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; and Mr. Boyle found that fifty and seven tenths weighed but a grain. As a cubic inch of gold weighs 4902 grains, the thickness of the gold-leaf examined by the one was the 207555th, and of that by the other only the 24552nd 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 sides are furnished with a high ledge, and the front, which is open, has a leather flap fastened to it, which the gold beater uses as an apron, for preserving the fragments of gold that fall off. Three hammers are employed in this business, having two round and somewhat convex faces: the first, called the cutch hammer, is about four inches in diameter, and weighs fifteen or sixteen pounds: the second, called the shoddering 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 membranes; some of which are laid between the leaves to prevent 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, flirip off from the large straight gut slit open, prepared on purpose for this use, and hence called gold-beater's skin. The general process of their preparation, is said to consist in applying one upon another, by the smooth sides, in a moist state, in which they readily cohere and unite indissolubly; fetching them on a frame, and carefully cutting off the fat and rough matter, so as to leave only the fine exterior membrane of the gut; beating them between double leaves of paper, to force out the remaining unctuity; mollifying them once or twice with an infusion of warm spices, and lastly, drying and prefling them. It is said, that some calcedine gypsim, or plaster 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 sticking. These skins, after seventy 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, heating them for a whole day, and afterwards rubbing them over with plaster 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 melt 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 3 of an inch wide, previously greased 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 paffed repeatedly between polished steel rollers, till it becomes a ribband, as thin as paper. This ribband is divided by compasses, and cut with shears into equal pieces, which are forged on an anvil till they are an inch square, and afterwards well annealed. Two ounces of gold, which is the quantity melted at a time, make a hundred and fifty of these ribbands; so that each of them weighs six grains and two fifths; and as 4902 grains of gold make a cubic inch, the thickness of the square pieces is about the 760th part of an inch. All these ribbands are interlaid with leaves or vellum, three or four inches square; one leaf being laid between every two of them, and about twenty more of the leaves are laid on the outsides; over these is drawn a parchment cafe open at both ends, and over this another, in a contrary direction, so that the vellum and gold leaves are both tight and entire. The whole is then beaten with the heaviest hammer, till the gold is stretched to the extent of the vellum: the pieces taken out of this cafe or mould, are cut in four with a flid knife; and the five hundred pieces thus produced are interlaid, in the same 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 division 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 sharpness, or with a frame of wood edged with cane. They are then fitted into books of twenty-five leaves each, the paper of which is well smoothed, and rubbed with red bale to prevent their sticking to it. The size of the French gold leaves is from somewhat less than three inches to ½ square; that of ours from three inches to ½. We shall here observe, 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 newest 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 pennyweights of gold are delivered by the master to the workman, who, if very skilful, returns 2000 leaves, or 80 books, of gold, together with one ounce and six pennyweights of waste cuttings. Hence one book weighs 4.8 grains; and as the leaves measure 3.3 inches in the side, the thickness of the leaf is one two hundred and eighty-two thousandth part of an inch.

The French prepare what is called green gold-leaf, 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 greenness to gold, and that this kind of leaf is made from the same fine gold as is the highest gold-coloured leaf, the greenish hue being a superficial tinge given to the gold in some part of the process; 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 one another; they are then heated and pressed together, so as to unite and cohere; and being beaten into line leaves, as in the foregoing process, the gold, though only in quantity a fourth of
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, Mofane, is gold applied in panels on proper ground, distributed into figures, lozenges, and other compartments; part of which is shadowed to raise or heighten the rest. See Mosaic.

Gold Plates for Enamelling are generally made of ducat gold, whose fineness is from 22½ to 24½ 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 disperses the plates to tarnish, and turn green. See Enamelling.

Gold, Potable, aurum potabile. See Aurum Potabile, 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 distilling to dryness a solution of gold in aqua regia; by evaporating the mercury from an amalgam of gold, taking care well to filter the muds after 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 Precipitated with Tin, called also, from its supposed different nature, calx Gafth, 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 menstruum for the tin. Into this mixture some fine black tin granulated, is to be let fall, grain by grain, waiting till one grain is dissolved before another is dropped in, that the dissolusion 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 discovering and precipitating any gold that may still remain in it; the liquor being then poured off, the precipitate is washed and dried. Lewis's Com. 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 baster'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 bottles; whence its name. When it is used, it is diluted with gum-water, or spirit finds. The German gold-powder, prepared from the Dutch gold-leaf in the same manner, is generally used, and when it is well covered with varnish, answers the end in splendid gilding, as well as the genuine stuff. See Gilt Rose.

Gold-paper, for bound gold 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 f separately very fine in water; then mix them together; add the oil and tallow, and ground the mixture to a due consistence; or it may be more simply prepared by grinding together some finely 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-leaf of Jews, prepared by polishing gum arabic and asphaltum, or, if one ounce of 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 filter them till the whole be incorporated, and appears, on growing cold, of the consistence of talcum, in the mixture through a flannel, and keep it stowed up in a bottle, for use. When it is used, it must be ground with as much varnish 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 acacia; 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 and use it as the other.

Goldsmith, or as some choose to express it, floristsmith, the artist who makes vessels, utensils, and ornaments in gold or silver. The goldsmiths work is either performed in the mould, or bent out with the hammer or other engines. All works that have raised figures are call in models, 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 bent, not cast. The bolder-worke of the goldsmith formerly required much more labour than it does at present, for they were obliged to hammer the metal from the ingots to the things they wanted; but there are now invented flatting-mills, which reduce metal to the thickness 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 assayed 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 silversmith, the goldsmith, the hatter, the tailor, the art of the gold-beater, are all employed by and under the goldsmith.


Gold-Thread, or spun gold, is a flatted gilt 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 regulating the motion, that the linear circulations of the twisted wire, on each thread, may still touch one another, and form, as it were, one continued covering. At Milan, it is said, they make a fort of flatted 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
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France require it to be spun on flaxen or hempen threads. The Chinese, instead of flatted gilt wire, use slips of gilt paper, which they interweave in their stuffs, and twist upon gilt threads.

GOLD, Tun of, is a kind of money of account, formerly used by the Dutch, and in some other 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 fix ounces four pounds. Twenty-two pence in copper farthings and half-pence, weigh one pound avoirdupois. A tun of gold, at 41. the ounce, amounts to 96,000. A tun of silver, at 5l. 2d. the ounce, to 6200. A pound flarding of gold to 4 S. An ounce is worth 4l. The penny-weight 4s. One grain, 2d. A pound of flering silver amounts to 3l. 2d. An ounce is worth 5z. 2d. The penny-weight, 3d. and something more; one grain a half-penny. A pound of silver avoirdupois comes to 5l. 5s. 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 αὐτόππος.

Such is ζηθήμενον, or gold-dust, and that got by lotion in the lavaderos in Chili : it is added, that there are maffes or lumps of pure gold found in the mines, particularly those of Hungary. Accordingly, in the emperor's collection, are still preserved several plates of gold, said to have been thus found.

Virgin gold is sometimes very pale, and so foist, that it may be moulded into any figure with the hand; it even takes an impression from a feel, 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 stiffwire work.

It is amazing to what degree of finesness the gold is here drawn; and yet it still keeps firm together, and never swells the leafy signs of the silver underneath it. The reader may see a computation herof, 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 stuffs, laces, embroideries, &c.

Manner of forming Gold Wire and Gold thread, both round and flat.—The first 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, brocades, and other commodities prepared from it. To a difference in this respect, the boasted superiority of the French laces 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 fix 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 steel burnisher. 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 5760 grains of silver. The largest proportion for the bell double gilt wire was formerly 120 grains to a pound; but the proportion of gold has been of late increased to about 140 grains. The first part of the drawing proceeds, as well as the preparation and gilding of the silver rod, is performed by the refiner, who uses plate 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, so that the rod may not be scratched against the outer edge, and that they may contain bees-wax, which makes the rod pass more freely, and prefers the gold from being rubbed off. One end of the rod, made smaller than the rest, is pulled through a hole that will admit it, when the plate has been properly secured, and held hold of by strong 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 cross 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 proceeds requires plates of a different quality, which are brought from Lyons in France, and are formed of metallic mafs, whose prevailing ingredient is iron: the holes are drilled in them here. These plates are of two sorts; some of considerable thickness, for the wire in its larger flate, 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 brass plate, called a fine, on which is measured, by means of notches, like steps cut at one end, the measure 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. Slots of different widths, in thick polished iron rings, serve also as gages for measuring the degree of finesness of the wire.

The wire-drawer's proceeds begins 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 fix or eight inches in diameter; in the top of which are two flaps, 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 proceeds, called degrossings, 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,
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Gold of Pleasure, in Botany See Myagrum.

Gold Coast, 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 Colla, or the Affilee, to the Volta, and deriving its name from the quantity of gold which it produces. It is bounded on the north by Kongo or Congo, 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. Adomur, called likewise Sako and Avena, Axim, Ankobar, Adom, likewise called Little Inkaflan, or Warhebi, Jabi or Jabo, Camomero or Guafio, Petu, Sabo, Fantin, Acoron, Agonna or Anguira, Amra or Aqualoubo, Lableade, and Niago 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, Aborrel or Aborco, and Eguira, at which latter place the Dutch had formerly a fort, and carried on a considerable trade in gold. Eight leagues E. of cape Apollonia stands the town of Axim, called by some Achembone. (See Achembone and Axim.)—See Acors, Adum, Aoderm, Anba, Camonero, &c &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 sort of millet with red grain, yams, potatoes, and other roots, all good in their kind. The sugar-cane grows here plentifully, and larger than anywhere 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 beasts. The domestic animals are bulls, cows, sheep, and goats, the last of which are numerous and their flesh 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, jackals, boars, deer of various sizes, cats, porcupines, monkeys, rats, mice, &c &c. Among the birds are pheasants, parrots, macaws, turtle-doves, and several others. The reptiles are numerous; such as snakes, lizards, vipers, lizards, scorpions, spiders, &c. The coasts, lakes, and rivers abound with fish, and likewise with alligators and gannans, 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 infalubrious, and often fatal, especially in the months of July and August.

It is ordered that of all the countries on the coast of Western Africa, the Gold Coast experiences the most intense heat. First, a modern traveller, near Rio Volta, has seen Fahrenheit's thermometer as high as 110° in his chamber, and 154° in the open air, surpassing by 26° the greatest heat observed by Adamson on all the banks of the Senegal. Although this traveller advanced only 10 miles from Chirikumbur on this coast, his journey is curious.
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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 areagreeably intersected with mountains, valleys, and hills. Fresh water, which is scarce and bad on the coast, is here excellent and abundant. About five miles from Christianburg he 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 precocity 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 incessant and covetous. When they obtain a victory over their enemies, they return home dancing and singing, and when defeated do the same round the graves of their friends and fellow-soldiers. Alike insensible of grief or joy, they sing till they die, and dance into the grave. The women are proportionably handomer than the men, fairer, flender, and well-limbed; their cheeks high, their mouths small, and their eyes indicating vivacity and spirit. They are quick, cheerful, and loquacious; gay in their deportment, and loath in their principles as to galantry, but temperate in their diet. When the men and women overcome their natural indolence, they are industrious, industrious, and ingenious; and apply to agriculture and gardening, far as they are excited by poverty or avarice. Their dress is various according to their rank and circumstances; but the rage of drefs 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 spurious race forms gangs of thieves and plunderers, void of decency, honour, honesty, or principles in their dealings with each other, with the Negroes, or the Europeans. These call themselves Christians, although they are the groffets 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, diffused 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 observable that the farther 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 consistency of bread, yams, and potatoes, over which they pour some palm-oil, and garnish the dish with herbs and putrid fish. This is their meat on common days; and on holidays they eat 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 cumbered with few ceremonies, and without any previous courtship; and they are as readily 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, sow millet, plant yams, and provide subsistence for the husband, who is idly spending his time in gorging, drinking, and smoking. The rich, however, have two wives, who are exempted from labour and all servile employments; 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, it is said, though practiced in other parts of Africa, is hardly known on the Gold Coast, except at Acre, 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 Acre. In the countries of Eguira, Aasia, An- cobar, Atea, and Adam, there are certain women who never marry, but are dedicated by profession to the public and initiated in their vocation in a formal manner. Among the Negroes there is a vast number of various technical arts, in which they are experts; such as the making of wooden and cardboard vessels and plates, chair-mattings, copper, or iron boxes, bracelets, necklaces, rings, and ornaments of gold, silver, or ivory; and all sorts of materials and inlets of war. Their tools, which are rude and simple, consist only of a bone for an ax, a pair of tongs, a pair of hammers, a file, a saw, and a hammer. They can finish with extraordinary exactness. Red-ware, and materials of gold, brass, and copper. In building houses, which are of various sizes, from 80 to 14 feet in length, and three or four feet in breadth, the Negroes are very ingenious, and they are no less dextrous in the use of them. With regard to the husbandry of the Negroes, they live in the rainy season, the soil at other times being unmanageably hard; and they adapt their ground to the nature of the grain; growing 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-dust, cowries, &c., is rated by certain officers of police, appointed by the king. Hither the men and women meet from considerable distances, bearing heavy burdens; 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-glasses, bracelets, ear-rings, glass-bells, and other female trinkets, sold to them for dyes and finery. The markets are exempted from all duties and impojs. 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, mufic, 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 six 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 Nigrina and Guinea above 100 years before the Portuguese began their discoveries; and in the year 1546, little credit is attached to these 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., reigning 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 Benin, 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. Purchases relates, that Alphonso, having little leisure for pursuing discoveries towards the latter end of his reign, gave an exclusive privilege for five years to Fernando Gomez, a citizen of Lisbon, to fail to the coast of Africa; and a person, deputed 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 1581 II. encouraged the commercial spirit of his subjects, and projected further discoveries; and it was probably upon this occasion, notwithstanding the affections of French writers, that fort St. George de la Mina, or Elmina, had its first rife. Join, the successor of Alphonso, conferred many privileges on this new colony. A few years after the same prince established a Guinea company, with exclusive privileges. In the reign of Henry III. of France, after the termination of the civil wars, 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 Coait 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 insolvency and cruelty. The first Dutchman who led the way to Guinea, was one Bernard Erick, in 1595. 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 Sahu, the Dutch obtained permission to build a fort, three leagues E. of Cape Corso, or Cape Coast. This fort was founded 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 succeded, 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 1585 and 1588, queen Elizabeth granted two patents to certain rich merchants of England; one 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, extending their limits from the mouth of the Straits to the Cape of Good Hope. The affairs of this company falling into disorder, the king erected another corporation, called the Royal African Company," which has subsisted to this day. This charter bears date, Sept. 27, 1663. This company, with a small capital, was diligent and successful; Cape Coast was enlarged and beautified; the forts of Acri, Dixtlove, Winchuck, Sukkonda, Commende, and Amabon, were built or repaired, all of them on the Gold Coast, and several within a little-shot of the Dutch settlements. They bought Fredericksburg of the Danes, and built a new fort in Whidah. See African Company.

GOLD CRONACH, 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; 63 miles E. S. E. of Konigberg — Alto, a river of Prussia, which runs into the Oonme; 6 miles N. of Goldapp.

GOLDAST, MELCHOR HEIMENSPFELD, in Biography, a learned writer of the 16th century, was a native of Switzerland. He studied the civil law in 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 1561-14. These volumes contain a collection of treaties on the civil and ecclesiastical jurisdiction of the empire. 2. "Alemannia Scriptores," three volumes folio, 1730. 3. "Commentarius de Bohemia Regno," 4to. 4. "Innoturiae de statu Bohemiae," 4to. 5. "Sylvia Francica," being a quarto collection of pieces relative to the maid of Orleans: "Scriptores Rerum Svecorum." 6. "Collectio Consectudinum et Legum Imperii." 7. "Politica Imperialia," and a collection of letters, written to him by several men of learning. This last work was printed at Frankfurt in 1688. Mr. Goldast was of a capricious temper and of changeable habits, which prevented him from rising in the world. He died in 1653, 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-miner in its vicinity, which was formerly very rich. The earth, called filglattel in Saxon, is dug near it; and the inhabitants are employed in the woolen and linen manufactories: 12 miles S.W. of Lignitz. N. lat. 51° 41'. E. lang. 15° 53'. Alto, 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 Bull, Bulla Aurea. See Bull.

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 by Exod. xxxii.

The commentators have been greatly divided on this article: the pulverizing of gold, and rendering it potable, is an operation in chemistry of the highest 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 rest, who allow
allow of nothing supernatural in it, advance nothing but conjectures as to the manner of the process.

Moles could not have done it by a simple calcination, nor amalgamation, nor antimony, nor calcination: nor is there one of those operations that quadrates with the text.

Mr. Stahl has endeavoured to remove this difficulty. The method Moles made use of, in making his aurum potabile, according to this author, was the same with that which now obtains; only, instead of tartrar, he made use of the Egyptian natron, which is common enough throughout the East.

Golden Cape, in Geography, a cape of England, on the W. coast of Dorsetshire. N. lat. 50° 43'. W. long. 2° 52'.

Golden Cape, a name by which some call the racemus, or cow-foot.

Golden Eye, in Ornithology, the Anas Clangula. See Duck.

Golden Eye, a species of fly. See Chrysops.

Golden Fleec, in the Ancient Mythology. See Argonautic.

Golden Fleec, Order of, 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 consisted of flints and feathers. The king of Spain is now grand 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 wool; though others will have a chemical mystery couched under it, as under that famous one of the ancients, which the adepti contend to be no other than the secret of the elixir, written on the fleece of a heep.

Golden Flower, in Botany. See Chrysanthemum.

Golden Flower-gentle, a name sometimes given to several species of the amaranth.

Golden Hand, in Ornithology, a water-fowl, otherwise called anas arctica. 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° 26'. W. long. 72° 32'.

Golden Lake, a lake of the island of Borneo. N. lat. 3° 36'. E. long. 115° 45'.


Golden Maiden-hair. See Adiantum aureum, and Polyticum.

Golden Monf-ear. See Hieracium.

Golden Number, in Chronology. See Cycle of the Moon, and Number.

Golden Precendary of Hertford. See Precendary.

Golden River, in Geography, a river of America, which runs into the Missirips, 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 Rod, or Sarracen's Wound-curt, virga aurea, in Botany. See Solidago.

Golden Rod Tree. See Bonea.

Golden Rule, in Arithmetic, a rule or praxis of great use and extent in the art of numbers, whereby we have 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 use under the article Rule of Three.

Golden Sapphire is a species of the inula or clecampane. (See Inula.) 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 destitute of its warm aromatic taint. See Saphire.

Golden Sacrifinge. See Chrysophrum.

Golden State, order of the. See Stole.

Golden Sulphur of Antimony. See Antimony.

Golden Thistle, in Botany. See Scorbium.

Goldenstein, in Geography, a town of Moravia, in the circle of Olmutz; 32 miles from Olmutz.

Goldsentetl, a town of Germany, in the country of Diefelholz; 11 miles N. of Diefelholz.

Golendraun, a town of Upper Lusatia; 16 miles S.E. of Goriitz. N. lat. 50° 27'. E. long. 15° 26'.

Goldingen, a town of the duky of Courland, situated near the river Wetsa, defended by an old castle, and containing two churches; 48 miles W.N.W. of Mittau. N. lat. 56° 51'. E. long. 21° 44'.

Goldlaüter, a town of Germany, in the county of Henneberg, 12 miles N.E. of Meinungen.

Goldman, Nicholas, in Biography, a mathematician, was born at Breifaw, in Silezia, in the year 1623, and died at Leyden in 1665. The works by which he is generally known are "Elementa Architerturæ Militaris," 1643. "De Ufo Proportionarii Circuli." "De Stylometricis," 1662, and another treatise "On Architecture," published in 1666, with numerous engravings, and the life of the author. Morte.

Goldoni, Charles, was born at Venice in the year 1707. Almoft from his infancy he gave indication of a humorous character, 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 pleased so much merit, that it required the testimony of respectable witnesses 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 Rimini. His mind was, however, too deeply engaged in theatrical exhibitions to make the system of Arifotle a predominant pursuit. Every leisure moment he spent at the theatre, till at length he passed from the pit to the stage, and joined a company of players. This, by his own account, was an error, which drew after it many serious confequences. He had been intended by his father for the profession of physic, 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 resident at Milan, where he became acquainted with the manager of the theatre, and wrote a farce for him, entitled "The Venetian Gondolier," which was performed and printed: by degrees he became united to the company, and composed 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 said 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 published in 1753 in 13 vols. 8vo. After this he published many additional pieces under the title of the "New Comic Theatre." He had composed 59 other pieces fo 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 first attempt was in a piece called the "Father of Love," but the bad success of this comedy was a sufficient warning to him to desist from his undertaking. He continued, during the remainder of his engagement, to produce pieces agreeable to the general taste, and published twenty-
twenty-four comedies. At the end of two years he was preparing to return to Italy, when he was suddenly urged to become Italian walmart to the princes, and to the reigning monarch. During this engagement he lost his sight, which he never after completely recovered, and at the end of three years he received a very inadequate remuneration for his labours and constant attendance at court, namely, 100 louis in a gold box, and the grant of a pension of four thousand livres per annum. This, with what he was enabled to make by his works, was amply sufficient for all his wants. When he had attained his 62d year he began to publish comedies in the French language, which were well received, and some of them became extremely popular. After the death of Lewis XV. Goldoni was appointed Italian teacher to the princes CLOTILDE, the present princes of Piedmont, and after her marriage, he attended the unfortunate princes Elizabeth in the same capacity. His last work was the "Volponi," written after he had retired from court. It was his misfortune to live to see his pension taken away by the revolution, and, like thousands in a similar situation, he was obliged to pass his old age in poverty and distress.

He died in the beginning of the year 1793, at a period when the Brissotines had the sway in the national councils, and when Goldoni would, for a short time at least, have received every attention that a grateful country could have afforded. As a comic poet, Goldoni is reckoned among the best of the age in which he flourished. His works were published at Leghorn in 1788-91, in 31 vols. 8vo. He has been reckoned the Molière of Italy, and he is styled by Voltaire "The painter of Nature." "Goldoni," says his biographer, "is one of those authors whose writings will be relished in the most remote countries, and by the latest posterity. His profound knowledge of the human heart, his extensive description of the vices and virtues of men, in all ages and nations, will justify my concluding this imperfect eulogy with applying to him the following lines of Horace from his first Epistle:"

"Æque pauperibus prodit, locupletibus æque
Æque neglectum pueros, famuli tibi nocentem.


His principal works are comedies in prose, for declamation, of which the exact number is not known; but they at least amounted to 120 before he left Italy at the desire of Louis XV. to write for the "Theatre Italien" at Paris, for which theatre he composed at least 50. This fertile, natural, and pleasing writer, was ambitious at first of treating serious and tragic subjects; but finding, as he tells us himself in his life and preface, that Metastasius was arrived at so high a point of perfection in his serious operas as that species of drama was capable of, he pointed his thoughts wholly to comedy, which had long been treated in such a burlesque and farcical manner, as to stand in great need of reformation.

But though he had determined not to attempt serious pieces for music, yet Galuppi prevailed upon him, much against his inclination, to furnish him with three serious operas for the theatre at Venice; these were, Oronce, King of Scythia; Gustavus Adolphus; and Statira. But though they had great success, Goldoni never thought them worthy of publication. He was not more vain of his comic operas.

However, he produced at different times and places 40 or 50, which, without his consent or knowledge, were collected and published in 6 vols. 12mo.; they are not very edifying works, being on the old burletta model, full of buffoonery, and a brand kind of Italian humour, tailed in no other country, though suited for the sake of the music, which is often ingenious, imitative, and sometimes graceful, but more frequently grotesque.

Goldoni 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 Pecini, 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 gained the improviso of the opera at Rome from ruins, and been performed in the principal cities of Italy. In the year 1762, Pecini, 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 become 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, Lovattini, and the serious man Savoi, with the buffo carativo Morigni.

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 Maritata," (or Pamela in high life), was brought out, the crowd at the opera-house was prodigious; but expectation was, as usual, so unreasonable as to spoil the feast; to gratify it was impossible. Some ascribed their disappointment to the composer, some 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. Music so 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 sake 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 poilt town of America, in Hancock county and state of Maine, incorporated in 1759, and containing 379 inhabitants; 47 miles E. of Pembroke. 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 Brochis, 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 LAMBRO Corallinus.

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 1730. 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 debts incurred, probably to administer to his disposition. He was intercepted 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, travelled through Flanders and part of Germany, passed some time at the universities of Strasbourg 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 1755, and laboured in most of his peregrinations, trust- ed for his support to his own casual efforts. His learning conferred him a favourable reception at the monasteries, and his German flute feldom failed to procure him a meal and a night's lodging from the pantheries, who were delighted with trains which a potter 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 pecuniary 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 ad- mitted as usher to Dr. Milner, who kept an academy at Pockrwm. Here he remained but a short time, and then refused 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 exercising his pen in obscurity, he be- came a pnlular among the 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 excite no expec- tations 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 "His- tory 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 1770, by the publication of his "Defeated Vil- lage," 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 ap- propriate 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 Mistakes of a Night." From this Goldsmith cleared a large sum, and it is still occasionally represented to applauding audiences. Notwithstanding the successes of his pieces, by some of which it is asserted he cleared 1800l. in a single year, his circumstances were ever very precarious, which was partly owing to the liberality of his disposition, and partly to an unfortunate habit which he had contracted of
gaining; the arts of which he knew very little of, and conse- quently became the prey of those who were bafe 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 compilation, that he formed a plan for a much greater work, viz. "A Dic- tionary 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 con- ditions of his life, and his affairs, had been frequently in his mind. In March 1774, he was attacked with the symptoms of a low fever, under which he lunk on the 4th of April. He was buried in the Temple church- yard without much attendanee, 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 solidly esteemed. The best part of his moral character was a warmth of tender- ness, which made him in all fortunes ready to share his purfe with the indigent, and rendered him in his writings the constant advocate of the poor and oppressed. The work feature was a malignant envy and jealousy of successful rivals, which he sometimes displayed in a manner not lefs ridicu- lous 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 foibles of individuals. This last talent he displayed in a very amusing manner in his poem entitled "Retafimation," 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 divsrs, 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 compafs of Eng- lish poetry, pieces that are read with more delight than "The Traveller," and "The Deserted Village." The elegance of the verfification, the force and splendour yet simplicity of the diction; the happy mixture of animal sentiment with glorious deference, are calculated to please equally the refined and the uncultivated taste. The moral and philosophical views of socety they exhibit are, indeed, objectionable; yet upon the whole they exert a favourable influence over the heart. In addition to their capital works, his pleasing ballad of "The Hermit," and some short humorous and miscellaneous pieces, complete the catalogue of his performances in verse. As a profe writer he devotes high praise for lyle, 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. Ann. Regis.

GOLDWIN, John, an ecclefaftical composer, was brought up under Dr. William Child, and, in 1697, suc- ceeded him as organist at the free chapel of St. George at Windor. In 1703 he was appointed master of the choristers 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 Chrysocoma and Gnaphalium.

GOLUMEH, in Geography, a town of Bengal; 18 miles E. of Ramgur. N. lat. 22° 28'. E. long. 85° 51'.

GOLETTA, a fortress of Africa, situated on a canal, in the kingdom of Tunis; 25 miles N. of Tunis.—Alfio, a narrow channel between the lake of Tunis and the sea, defended on each side by a caille.

GOLI, or Gour, the name of a diversion or exercice, much used in Scotland, and played upon the laws 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 aduant. He who can drive it with the fewest strokes of his club is the conqueror.

GOLFO TRISTE, in Geography, a bay on the coast of South America, in the government of Caracas. N. lat. 12° 31'. W. long. 68° 20'.

GOLGAM, a town of Hindoostan, in Dowlatabad; 15 miles N. of Beder.

GOLGOM, a town of the island of Ceylon; 48 miles N.W. of Candy.

GOLGOTHA. See Calvary.

GOLIATH, in Scripture History, a famous giant of Gath, who defied the armies of Israel, and was slain by David. 1 Sam. xvii. 4, &c.

GOLICH, in Geography, a town of Russia, in the government of Irkutsh, on the Lena; two miles S. of Orelgen.

GOLINDA, a small island near the N. coast of Cuba. N. lat. 23° 20'. W. long. 8° 4'.

GOLISANO, a town of Sicily, in the valley of Demona; 9 miles S. of Cefalu.

GOLITZ, a town of Nubia, on the left side of the Nile; 45 miles W.N.W. of Dongola.

GOLUM, James, in Biography, was born at the Hague in 1596; but he purified 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 excited the admiration of the emperor Moulay Zeidan, 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 passed more than a year at Aleppo, whence he made various excursions into Arabia and Mecopotamia. 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 Elmacin," which had been begun by Erpenius; also a life of the great Tamerlane, written by an eminent Arabian author: "The astronomical Elements of Allergan," with a new version and learned commentaries; "An Arabic Lexicon;" a "Persian Dictionary," which was printed in London. Bayle, Moreri.

GOLLENS, 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 denized to this service, and having visited every part of Syria and Palestine, founded a monastery of his order on mount Lebanon, over which he presided till he was recalled to Rome. Here he was employed as one of the principal assistants of Sergius Renatus, archbishop of Damascis, 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 author of translations into Arabic of Thomas' Kopem's imitation of Jefus Christ: of sermons on the Evangelists: an "Historic Discourse of St. Gregory of Dascopolis," several small devotional pieces, and a translation from Arabic into Latin of a "Collection of Parables and Proverbs." Moreri.

GOLDI, or Golli, in Geography, a town of Africa, near the river Grado, the inhabitants of which trade in flaves, 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 Kapidorf.

GOLNOW, a town of Anterior Pomerania, formerly Hanftein, situated on the Ilma; 12 miles N. of Stargard. N. lat. 53° 37'. E. long. 24° 57'.

GOL, a river of Corsica, which rises nearly in the centre of the island, and pursues a N.E. course, runs into the sea; 12 miles S.S.E. of Ballia. It gives name to one of the two departments into which the island is divided; the other being Lianome. Golo comprehends the northern division of Corsica, in N. lat. 42° 30', and containing 156 square leagues, and 163,466 inhabitants, is subdivided into three circles, viz. Ballia, whose inhabitants are 47,842; Calvi, having 20,282 inhabitants; and Corte containing 35,342 inhabitants. There are several lofty mountains near the centre of a chain that traverses the island longitudinally. The most considerable lakes are Ino and Creto, the former of which is of unknown depth. The soil is tolerably fertile, yielding barley, millet, olives, chufutas, wine, fruits, &c. On the hills are forells and excellent pastures. See CORSICA.

GOLOBUNGE, a town of Bengal; 10 miles E. of Silhet.

GOLPHINGTON, the chief town of Washington county and state of Georgis, in America, situated near the head of Ogochee river, about 26 miles E.S.E. of Oconee town.

GOLPS, in Herod. are roundles, or torteaux, of a purple colour.

GOLTBERGENSIS TERRA, in the Materia Medica, is a whith 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 Ligntz in Silfia; but particularly at this time in the neighbourhood of Haife, in the bishopric of Liege, in the circle of Wellphalia. It is taken up there in considerable quantities, and usually is sealed with the impression of an eagle, and with its old name Goltbergenis 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 aundis lane; but experience shews that it doth not contain a particle of that metal. It is a dense compact
compact earth of a dull greyish white, soft and friable, and adheres firmly to the tongue, and makes no effervescence with acids.

GOLTIAVINA, in Geography, a town of Russia, in the government of Tobolsk; 188 miles E. of Enfick. N. lat. 58° 20'. E. long. 93° 14'.

GOLTPACH, a town of Prussia, in the patinatate of Coln; 8 miles N.E. of Thorn.

GOLIVA, a town of Russia, in the government of Kiev; 112 miles S.E. of Kiev. N. lat. 49° 15'. E. long. 32° 55'.

GOLTZEN, a town of Lower Lusatia; 10 miles W. of Lauen. N. lat. 51° 58'. E. long. 13° 30'.

GOLZIUS, HENRY, 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 more important Greek works preserved at Rome; and therefore travelled to that city, where he resided some time, and thence drew an ample flock of materials for his future progres in the art he professed.

He lived principally at Antwerp, where he painted the history of Jafon; 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.

GOLZIUS, 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, Polidoro, and Michael Angelo; the last of whom appears to have been his favoured Apollo in the art, but whose faults he exaggerated in an outrageous manner, deluding attaining any of his beauties. Hence his style of design is inflated and caricature; and his expressions participate of the same tale but his hues of line in colour are rich, vigorous, and transparent. He died in 1617, aged 59.

GOLUS, in Geography, a town of Prussia, in the territory of Coln; 25 miles S.E. of Coln.

GOLUENSKA, a town of Russia, in the country of the Cossacks, on the Don; 200 miles E.N.E. of Azosp.

GOMAHNY, a town of Hindoostan, in the cerc of Moghurunge; 45 miles N.W. of Harripour—also, a town of Bengal; 8 miles S.E. of Goragot.

GOMAR, FRANCE, 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 patriciate in 1573, for the sake of professing their principles in peace and security. Their son Francis was sent to Strasbourg for his education, and purified his studies there under the celebrated John Sturm, after which he went to New-fildt, whither 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 affability he became very deeply learned in the Greek and Hebrew languages, and in 1587 he settled with a Dutch congregation at Frankfort, and continued to discharge his ministerial functions until the year 1593, when his flocks 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 Armi-
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 nanim on Julqin, we found its chief merit to consist in imitations of his admirable manner. This composition was in the third ecclesiastical mode of E, with a minor second, as well as third; which Mr. Blainville some years ago wished to pass on the public for a third or new key, different from the major and minor, which comprise all familiar music at present. And it is extraordinary, that this pretension should have had any adherents 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 Rouffeau, art. Mode.

GOMBREVILLE, MAIR LE ROI, Seur de, a man of letters, was born at Chevreuse, 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 assembled by cardinal Richilieu 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 confecting 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 "Diction sur les Vertus et les Vices de l'Histoire et de la Maniere de bien Ecrire." This is deemed a sensible and very judicious performance. Moreiri.

GOMBEEY, in Geography, a town of Asia, in Botonga, on the Zambere. 8 lat. 18'. E. long. 36'.

GOMBEZCALA, a town of Peru, in the province of Farfifiain; 106 miles N.N.W. of Chirias.

GOMBIN, GAMII., or Gabin, a town of Poland, in the duchy of Warsaw, situated on the river Duna; 34 miles N.N.E. of Warsaw.

GOMERON. See GAMERON.

GOMER, in Scripture History, the son of Japheth (Gen. v. 2.) and, according to Josephus, father to the people of Galata. The ancient inhabitants of that country were called Gomares before the Galatians fessed possession of it. The Chaldees place Gomer in Africa; Boulhart in Phrygia, because Phrygia, in Greek, has the same signification (a coal) as Gomer, in Hebrew and Syriac. Others are of opinion that the ancient Cambi, or Cimmerians, sprung from Gomer, and probably from them the Welsh, called Cymry. It is not improbable, that Gomer, or the Gomerites, his descendants, peopled likewise Germany and Gaul; the name German not differing much from Gomerian. Cluver (Germ. Antiq. l. i. c. 5. 6.) conjecturing that the ancient Celtica comprehended Ilyria, Germany, Gaul, Spain, and the British isles, as all these people an idly spoke the fame language, further supposes, that Gomer, or his family, peopled the countries in Asia, between the Paropamisus and mount Iannus, and between the confines of the Oxus and Oby; whence these people are called Gomares by Ptolomy (l. vi. c. 17.) and Mele (l. i. c. 2.).

GOMER, or Gomer, an Hebrew meteeme. See CORES.

GOMERA, or VELEZ DE PEINX, in Geography, a kalle of Africa, in the country of Fez, built on a rock near the coast of the Mediterranean. Before this fortress there was anctently a city, called "Bedes," imagined to have been founded by the Carthaginians. The Arabs called it Belis and Veles, 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 hills of Gibraltar, near the above-mentioned fortress.

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-cane and vines in abundance, as well as figs, together with sufficient corn for the supply of the inhabitants, who amount to about 7000; 18 miles S.W. of Tenerife. N. lat. 28° 6'. W. long. 27° 8'.

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 1488 at Guadalaxara 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: "Musa Paulina," or the epistles 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 Burgundiae Militia quae Velletris aurei vocant," is reckoned his master-piece. The subject which he chose in this instance was more favourable to poetry than the others. Moreiri.

GOMEZ DE CASTRO, ALVAREZ, a native of St. Eulalia, near Toledo, was educated at Alcalá, where he obtained a high character for diligence and real learning. He was patronized by Philip II., who engaged him to prepare an edition of the works of Idiades, 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," inferted in a collection of the writers on Spanish history. Gomez died in 1520, at the age of 65. Moreiri.


GOMEZ, SEBASTIANO, a Mulatto 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 Lof. Mercenarios Descalzos, 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 matter, whose decease happened in the year 1683.

GOMGAH, in Geography, a town of Hindooistan, in the circuit of Surgooga; 22 miles S.W. of Surgooga.

GOMI, a town of the province of Gurel, on the Black sea.

GOMMERN, a town of Saxony, on the Elbe; 8 miles E. of Magdeburg.

GOMMALPAR, a town of Hindooistan, in the circuit of Guntoor; 15 miles E. of Innaconda.
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, consumed by fire from heaven. It was probably the most northern of the five cities. Gen. xix. 24.

GOMOZIA, or GOMEZIA, in Botany. See NERTHEA.


Gen. Ch. Cal. Perianth inferior, of five lanceolate, sharpish, ribbed, colored, decussated leaves, two of which have a membranous margin at each side, one on one side only, and two are detached 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, curving at the top, on the outside, by two pores. Pist. Germs placed on a short flabellate angular receptacle, with five angles and five divisions; style longer than the stamina, marked with five furrows; stigma acute. Peric. Drupas from one to five, mott generally two, ovate, obliquely attenuated at the base, somewhat compressed, obtuse, erect, spreading on a very large globose 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. Jabotapita, (Ochra Jabotapita; Linn. Sp. Pl. 732. Jabotapita pyramidal flore luteo, fructu rubro; Plum. L. 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, stalked, ovate, acute, serrated. Flowers in terminal clusters, yellow, fragrant, compared by Marsgrave 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 Ochra, both in habit and character.

GOMPFIASIS, from γομφος, 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 circumstance 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, furnished with a tooth at each side, placed on the top of the united filaments. Stam. Filaments five, colorless; anthers of two cells, terminated by a membranous, and producing two compressed masses of pollen, which attach themselves by a taper point to the stigma, and remain pendulous there. Pist. Germs 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. Foliaces two, inflated, ovate, pointed, clothed with soft trusses. Receptacle membranous, longitudinal, linear, at length separate. Seeds numerous, imbricated, pendulous, crowned with silky down.


This genus is separated from Asclepias by Mr. Brown, (whose effay on the whole order, and whose discovery of the mode 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 singular horn which in Asclepias grow out from the bottom of the nectaries. It conforms of Asclepias arborensis, Linn. Mant. 216; fruticosa, Linn. Sp. Pl. 315; and sevens, Vahl. Symb. v. 1. t. 8; and, as Mr. Brown supposes, of cribosa, Linn. Mant. 215. Suppl. 170. A. pubescent, Linn. Mant. 215, is, as he justly observes, on the authority of the late excellent Mr. Dryander, borrowed from the Linnaean herbarium, the same plant as arborensis, with a synonym from Plukeet (t. 135. f. 1.) and Morison, which is prefixed to be cribosa.

GOMPHOLOBIUM, so named by the writer of the present article, from γομφος, a knoll, club, or any thing swelling upwards from a narrow base, and γομμος, a pod, or legume, expressive of its tumid fruit. Sm. Tr. of Linn. Soc. v. 4. 220. Ann. of Bot. v. 1. 555.—Clafs and order, Decandria Monogynia. Nat. Or. Papilionaceae. Linn. Legumenosa. Juff.

Gen. Ch. Cal. Perianth inferior, of one leaf, coriaceous, short, bell-shaped, in five deep, oblong, pointed, unequal segments. Cor. papilionaceae. Standard very large, more or less heart-shaped, carinated at the back, recurved, with a short claw. Wings shorter than the style, 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 reversed tooth at the upper edge of each. Stam. Filaments ten, concealed in the keel, awl-shaped, dilated, ascending, rather unequal in length; anthers roundish, two-lobed. Pist. Germs flalked, oblong, somewhat cylindrical; style awl-shaped, ascending, as long as the flaments; stigma fimbriate, acute. Peric. Legume on an ilalk, nearly globular, inflated, of one cell, crowned with the style. Seeds several, roundish, ranged along the upper future on short filaments.


Five species of this genus are defined in the Transactions of the Linnean Society, v. 9. 249, G grandiflorum, Exot. Bot. t. 5.—Latifolium, (fouabriam; Exot. Bot. t. 58.) fuculorum, a species communicated by Mr. Menzies: minuus, very near the last, except in the acute recurved points of the leaves; and pinnatum, a small species from Port Jackson, remarkable for its pinnate leaves, and zigzag herbaeous stem. Probably the sublimate volume of Mr. Brown's Prodromus will add more to this number.

The habit of Gompholobium is marked by the compound (ternate or pinnate) leaves, and a certain aspect of rigidity and smoothness. The stipules are not intradriaceous as in

Potentilla.
GOM

Puttenes, but stand on each side of the base of the common footstalk, being a pair of acute flat clove-prest leaves, extremely minute, and often altogether wanting. The flowers are yellow, generally numerous, large and handsome; in G. sebem, they are purple when dried, but this is suspected to be an alteration of their original hue, and they are judged, from the analogy of Derrifia, to be yellow, with crimson keel and wings, when fresh.

All the species, as far as hitherto known, are natives of New Holland. S.

GOMPSTOPSIS, in Botany, from γόμπτστόπίς, a mail, denotes the manner in which the fangs of the teeth are fixed in their sockets.


Gen. Ch. reformed. Col. Perianth inferior, coloured, membranous, permanent, double; the outer of 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, cylindrical, the length of the inner calyx; its margin equally five-leaf, 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. Pet. Capsule roundish, membranous, of one cell, burrowing all round. Seed solitary, large, roundish, with an oblique point.

Eff. Ch. Calyx coloured, the outer of three unequal leaves; inner in five deep segments. Corolla cylindrical, five-toothed, bearing the filaments at its orifice. Capsule burrowing all round. Seed solitary.

The species of Gomphora come under the denomination of Everlastings, or Aramaria, 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 green-house. The original crimson form is much more handsome than the paler varied variety.

G. perennis, figured in Dill. Hort. Elth. t. 20, a native of Buenos Ayres, is scarcely cultivated but in curious gardens, having heads of yellowish flowers of no remarkable beauty.

There are eight species besides in Wildenow, of which the arborensis, Linn. Suppl. 173, is by far the most remarkable. This was not sent to Linnaeus by Nuttis from New Granada, as erroneously alleged by the younger Linnaeus in the Supplementum, but by Vandelli, who received it from Brazil, and who has designated it under the name of Bragantia, in his Fl. Brazil. p. 6. The stem is woody, round, leafy, clothed with rigid, prominent, brown hairs, as are also the leaves, which are opposite, obovate, obtuse, entire, about three inches long, and half as broad. Heads terminal, solitary, the base of an African Marigold or Tagetes, pale red or whitish, composed of innumerable flowers, the segments of whose calyx are about six to eight long, linear, acute and softly clothed in their lower part, with long dense silky hairs. We know of no figure of this fine plant.

Mr. Brown, Prod. Fl. Nov. Holland. v. i. 416, all new species to Gomphora, while he removes from it the be蜊enifla and terminifera, which, with two new ones from the tropical part of New Holland, he forms into a new genus, Philoxera. He considers what we term corolla in Gomphora, as the tube of the united filaments.

Gomphora, 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 heads, which two 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 hatchelor's buttons in America.

Method of Cultivation.—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 dark hot-bed. When the plants are up, they should be watered often with care; and, after they have attained some growth, be removed with their roots into other pots, and replanted in the open ground. When they have 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 be often refreshed with water, and have air admitted freely as the farmer advances, till they are capable of bearing it without injury; when about August they may be set out during the daytime, 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 afflumage with other plants of the potted kinds.

GOMRAITENIO, in Geography, a town of Hindoostan, in the Carnatic; 25 miles N. of Madras.

GOMS, one of the seven independent dixains or common-wealths of the Upper Vallais, in Switzerland; called Dixain, because the Upper and Lower Vallais comprehend 11 districts, each being a dixain or tenth of the whole. Goms is situated at the foot of mount Grimsel, and extends along the bank of the Rhone; and is so called from a town, 33 miles E. of Sion. See Vallais.

GOMUT, a river of Bengal, which runs into the Magna near Chandpore.

GOMUT Pepere, a town of Hindoostan, in Dowlatabad; six miles N. of Amedanagur.

GOMUTTRA SELAGUTTA, in Natural History, the name given by the Indians to a kind of fowl, 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 fowl, and after calculation the reddish, given in cafes of internal ulcers and in gonorrhoeas. The Indians supposed it formed by the drying up of the cows' urine.

GONACRA, composed of यु, ल्ल, and ई, ब्रह्म, । फ्रीि, in Medicine, the gout in the knee. See Goff.
GONAMBouch, in Ornithology. See Emberiza Grica.

GONANPILLY, in Geography, a town of Hindooftan, in the cirecor of Ellore; 18 miles N. E. of Ellore.

GONAPI, one of the smaller Bandha islands, in the centre of which is a volcano. The only inhabitants are wild hogs, cows and serpents. S. lat. 4° 10'. E. long. 150° 34'.

GONARCHA, a term in the ancient dialling. Mr. Perrault, in his notes on Vitruvius, lib. ix. cap. 9, takes the gonarcha 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 vert, knee, or vertice, angle.

GONARY, in Geography, a town of Hindooftan, in the Mylore; 12 miles S. of Kydroid.

GONAVE, 1A, an island situated on the west side of St. Domingo, about 14½ 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 13½ leagues W. by N.W. from Port au Prince. N. lat. 18° 54'. W. long. 73° 40'. See St. Domingo.

GONAVES, a fort on the above-mentioned island, at the head of a bay of its own name, on the N. side of a bay of Legone. 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 refer 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'.

GONCANAAM, a town of S. America, in the audience of Quito; 20 miles S.W. of Loxa.

GONCELIN, a town of France, in the department of the Ifere, and chief place of a canton, in the district of Grenoble; 13 miles N.N.W. of Grenoble. The place contains 1,558, and the canton 10,259 inhabitants, on a territory of 1,671 kilometers, in 13 communes.

GONDAR, the metropolis of Abyftinia, is situated upon a hill, elevated 840 feet above the ocean, and confines 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 houfe, 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 preceding 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 Faedida, and by such Abyftinians as had been instructed in architecture by the Jefuits, without embracing their religion, and afterwards remained in the country, unconnected with the expulsion of the Portugueses, 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 1½ English mile in length. The mountain, on which the town is situated, is encompassed on every side by a deep valley, which has three outlets; the one to the south, to Dembea, Matthaw, and the Agows, the second to the N.W., towards Senammar over the high mountain Debra Tsai, or the mountain of the Sun, at the foot of which Kofcam, the palace of the Iteghë, is situated; and at the mouth of the Kordhen, the palace of the other Iteghë; the third is to the N. to Woggora, over the high mountain Lumalanon, and on through Tigré to the Red sea. The river Koba, coming from the mountain of the Sun, runs through the valley, and covers all the south of the town; the Angurab, falling 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, containing about 10,000 houset. They are all active and laborious, and are employed in taking care of the baggage and field-equipage 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' S. 30'. 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 affilling Odace against Theoderic, ent red Italy, carrying fire and sword through Emilia and Liguria, and made a great number of captives, many of whom he liberated without ransom, at the request of Epiphanus 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 revenged himself upon his brother Godegesil, who had joined Clovis, surprised 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. Those, says the historian, were in general founded on equity, and display much sagacity in preventing all causes of dispute; nevertheless, they enjoin the barbarian 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 Gambrette, 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. Hitt.

GONDEGAMA, or GONDELACOMMA, in Geography, a river of Hindooftan, which forms the nominal boundary of the Carnatic, and discharges itself into the sea at Medipelly, Combam, or Commam, is near its source. It is sometimes called Giligama, and Guata-camma.

GONDICOTTA, a town of Hindooftan, in Narawar; 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, gonduca. Du Cange derives it from the vulgar Greek saivadca, a bark, or little fish; Lancelot deduces it from sa, a term in Athenæus 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.
GON

The address of the Venetian gondoliers, in passing along their narrow canals, is very remarkable; there are usually two to each gondola, and they row by pulling before them. The foreman rests his oar on the left side of the gondola; the hind-man is placed on the stern, that he may see the head over the till or covering of the gondola, and rests 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.

GONDOLA, in Natural History, a name given by authors to a peculiar kind of concha globosa, 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 CONCHOLGY.

GONDAR, 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 8873 inhabitants, on a territory of 34000 square kilometres, in 24 communes.

GONDUFEL, a town of Africa, in the kingdom of Kong; 100 miles S.E. of Kong.

GONDWARRAH, a town of Bengal; 15 miles S.S.W. of Purnea.

GONESSE, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Pontneuf, nine miles N. of Paris. The place contains 2402, and the canton 14811 inhabitants, on a territory of 1824 square kilometres, in 22 communes.

GONET, John Baptist, in Biography, was born at Beziers 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 Bordeaux in the year 1640. 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 1674, when he was appointed provincial among the Dominican friars. In 1675 he refixed his abode 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 system of divinity, entitled "Clypeus Theologica Thomistic, contra novos ejus impugnatores," first published at Bordeaux in 1666, in eighteen volumes 12mo, but it was afterwards enlarged, and printed in five volumes folio. He was likewise author of a "Mammal Thondilaram, seu brevis Theologia Curus," which has passed through different editions, of which the last was published at Lyons in 1681; and "Differtio Theologiae de Probabilitate." Morell.

GONFALON, or Confax, a kind of round tent, borne as a canopy, at the head of the processions 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 bason, with a ridge round it, and beaten by a mallet covered with several folds of woolen 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 bason a musical tone may be produced; but different parts of the circle produce tones of different gravity and acuteness.

GONG, in us used in processions, and at court on days of ceremony and festivals, in concert with other instruments, as a double drum. On the water, in vessels that are rowed, this instrument regulates the strokes of the oars.

It is formed of brass or bronze, and called lu by the Chinese, who, on hearing it only on great occasions, regard it with reverence.

GONGA, in Geography, a town of European Turkey, in Romania, near the sea of Marmora; 36 miles N.E. of Gallipoli.

GONGA, or Bain Gonga, a river of Hindoostan, which falls into the Godavery about 50 miles from the sea. See Bain Gonga, and Godavery.

GONGACA, a town of Bengal; 30 miles S.W. of Calcutta.

GONGADEE, a town of Bengal; 30 miles S.W. of Regonampour.

GONGLARA, in Botany, a name by which Imperata has called a very beautiful sea plant, known among botanical writers by the name of fucus erica folius, or erica marina, the sea holly.

GONGONG, is an instrument used by the Hottentots, and all the negroes on the west coast of Africa. Of this kind there are two sorts, the large gongong and the small. In the supplement to the fifth edition of the French Encyclopédie, a description of this instrument has been attempted, that seems totally unintelligible.

"The small gongong (say the editors) is an iron or holly bow, of which the string is the finew of a sheep dried in the sun, or a bowel string; at the extremity of the bow is placed, on one side, the pipe of a fplit quill, in the hollow of which the string of the bow is lodged. The performer holds this quill in his mouth while he is playing, and the different tones of the gongong proceed from the different modulations of his breath."

"The great gongong only differs from the small by the shell of the cocoa-nut, of which the upper part has been cut off, and the string of the bow, before its tension, passed through it on each side. In touching the instrument the cocoa-shell is moved to and from the quill according to the tone which is to be produced."

We hope our readers will comprehend this description, by which we frankly own ourselves not to be much enlightened; nor can we well conceive how the motion of the split quill, or the fiction of the cocoa-nut, can produce different tones. Nothing that answers to this description is to be found on the plate referred to (fig. 3, Pl. 11.) but in Pl. III. fig. 9. May. Ind. there is, we think, a very unsatisfactory representation of it. And in the rude state in which the European arts in general have been found in such parts of Africa as have already been explored, we have little reason to lament our ignorance of the construction and use of the gongong.

GONGOO, in Geography, an island in the Neel Abud or Guin river of Africa, in its course between Caffina and Kaffina, and Mezkara. N. lat. 16. E. long. 11.

GONGOPOUR, a town of Hindoostan, in Oude, 12 miles S. of Kaibad.

GONORA, Lewis, in Biography, a celebrated Spanish poet, was born at Cordova in 1762. He studied at Salamanca, and being brought up to the church, was made chaplain to the king, from whom he received considerable ecclesiastical preferment. He died at Cordova, of the church of which he was prebend. His reputation is built on a volume of poems, under the title of "Obras de Don Lewis de Gongora y Argones," 4to. The poems consist of a variety of compositions, chiefly of the shorter kind, especially
lysical, in which style he so much excelled, as to be termed
by his countrymen "the prince of lyric poets." Gon-
gora polishes, in the estimation 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 enemies 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. Moreri.

GONIARRON, in Surgery, a hard tumour; but espe-
cially a branchocoele, or swelling of the thyroid gland.
The word is said to be derived from 727,727, a round tubercle
on the trunk of a tree.

GONHARY, in Geography, a town of Hindooistan, in
Onoe: 40 miles W. of Lucknow.

GONIA, a town of Attic Turkey, in Natolia; 16
miles W. of Apshian-Karabiar.

GONIAH, or Kono, supposed to be the Contoh of
D'Anville, and the Gorge of Delphos, a kingdom of Africa.
Situatet to the N. of Guinea, between the meridian of
Greenwich, and 5 W. long, and between the 10th and 12th
degrees of N. lat. It is about 870 miles westward from
Cadtha or Kattina, and between 530 and 620 miles from
the Gold Coast. Some say, there is no communication be-
tween this coast and the country of Gonjah; the king of Af-
centoi, who polishes the intervening space, prohibiting his
inland neighbours from passing through his country. Others
report, that other states (e. g. the Fannees, and their confede-
rates) lie between Afcentoi and the sea; and that the Af-
centois have often unsuccessfully attempted to open a com-
munication with the coast.—Alio, the name of a town, which is
the capital of the kingdom of Gonjah or Kong. N. lat.
11° 50'. W. long. 3 30.—Alio, the name of part of a
claim of mountains, extending from almost the mouth of the
river Gambie, in the Atlantic, to Nigria, towards Abyssi-
nia.

GONIAH, a decayed town and large castle of Attic
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 Janissaries, and inhabited chiefly by feamen;
50 miles E.N.E. of Trebisond. N. lat. 41° 9'. E. long.
41° 10'.

GONJENPILLY, a town of Hindooistan, in the Car-
natic; 18 miles N.E. of Nellore.

GONIOCARPUS, in Botany, so called from εγκεις, an
angle, and 327,727, fruit, expressive of one of its efficien-
t characters. The name, originally contrived by Thunberg, was
Goncarpus, which being incorrectly contrived, and too
near Gonocarpus, 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 γα διας, a lance, but to the very pecu-
lar angles of the fruit.—Konig in Ann. of Bot. v. i. 546.
t. 12. f. 3. 6. (Gonocarpus; Thunb. Nov. Gen. 55. F.
Lamarec. Illntr. t. 73. Gonocarpus; Schreb 86.
Willd. Sp. Pl. v. 1. 692. Mart. Mill. Dict. v. 7.)—Clas-
and order, Gonocea Monogynia. Nat. Ord. Ovagras, or
Oongraea, Jull. Konig.

Gen. Ch. Cot. Periun superior, in four deep, acute,
equal, upright segments. Cot. Petals four, equal, oblong,
convex, 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. German inferior, turbinate,
with eight stamens and as many angles, crowned with the
permanent calyx; style extremely short; stamens four, ob-
tuse, downy.

El. Ch. Calyx superior, in four deep equal segments.
Petals four. Drum dry, with eight angles. Nut solitary.

One cell.

Three species of this inconspicuous though curious genus
are at present known.
1. G. micrantho. Thumb. Jap. 69. t. 15.—Leaves ovate,
obtuse, crenate, smooth, as well as the stem.—Gathered by
Thunberg in Japan. Root fibrous, annual. Stem three or
four inches high, ascenditng, quadrangular, smooth, leafy,
fimbly below, panicked above. Leaves opposite, on short
stalks, ovate, rather acute, half an inch long, bluntly crenate
and carinationgs in the margin, smooth on both sides, minutely
dotted, furnished with a rib, but no veins; the upper one
gradually smaller and more entire. Stipiles none. Flowers
very small, purplish, drooping, in several slender, lax, upright,
spikes, forming a fort of panicle. The petals as well as calyx
are sufficiently evident in Thunberg's own specimens before
us. The fruit is no bigger than the smallest pin's head, and
the petals feebly longer.

2. G. rotundifolius. —Leaves rounded, somewhat heart-
shaped, obtuse, 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 slightly angles of the
stem, induce us to propofe it as a species. Possibly the pan-
cled spikes may owe to the greater luxuriance of the spe-
cimens. The fructification appears precisely like that of the
fruits species.

—Leaves elliptic-lanceolate, sharply ferrated, blister as well as
the stem.—Gathered by Mr. David Nielson, 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 deprestted bristles, and having longer and nar-
rower sharply ferrated leaves. The flowers, moreover, have
eight flames, and the angles of the fruit are wavy or crinkled,
not smooth and even.

We have a plant gathered by Dr. White, near Port Jack-
non, which seems to answer in every point to Mr. Konig's
definition and figure of the last, except that its petals have
a brilily keel, and the stamens are singularly branched
and plumose, making a large tuft in the centre of each flower
after the petals are fallen. Perhaps Mr. Konig's specime
has lost all their stamens. We remark, however, a further
difference in the fruit, whose alternate angles are less distinct,
or rather more crinkled and interrupted than the rest.
Not having examined authentic specimens of G. fuscifolius,
we must leave this matter in doubt.—Possibly this may be G. tergo-

GONIOMETER, an instrument used for the purpose of
measuring small angles (particularly of crystals), or the
inclination which one plane surface makes with another. The
smallest goniometers, as usually fold at the shops, are of a
construction so simple, as to require but little description.
They generally consist of a small pair of compasses or nippers, de-
fined 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 degree.

But notwithstanding much sagacity has been bestowed on
instrument described on this principle, none have
Goniometer.

have been found nearly accurate enough for the purposes for which they are required, many interting 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 pos-
dibly desire. The principle of this invention is entirely op-
tical, and (Plate XIX. Mfcedony, fig. 2) represents the in-
strument as made and sold by Mr. Carey, in the Strand; but
the reader, when acquainted with the nature of it, will rea-
dily see that any person possessed of a graduated instrument,
such as a theodolite, transit, &c., may, without great diffi-
culty, 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 it-
self; and, for a radius of 1-50th of an 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 1809, consists of a circle, grad-
ated on its edge, and mounted on an horizontal axle sup-
ported 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, hori-
zontal and parallel to the axis of motion. This position of
the circle is first adjusted, so that by turning the smaller
axe, 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 ref-
lects 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 sur-
f ace 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 fracture of laminated substances; for
since all those small portions of a shattered surface that are
parallel to one another, (though not in the same plane),
glisten at once with the same light, the angle of an irregu-
lar surface may be determined nearly as well as when the re-
flected 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 interference 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 re-
dered 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 dif-
cult chimney may be seen inverted beneath its true place,
and, by turning the small axis, may be brought to corre-
spond apparently with the bottom of the house, or some
other distant horizontal line. In this position the surface
accurately reflects 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 observa-
tions. Dr. Wollaston has remarked one instance of a mis-
take that prevails, respecting the common carbonate of lime,
which he mentions, because this substance is very likely to
be employed as an object of the correctors of such a goni-
ometer, by any one who is not convinced of its accuracy,
from a distinct conception of the principles of its construc-
tion.

The inclination of the surfaces of a primitive crystal of
carbonate of lime, is stated with great appearance of pre-
cision to be 105° 28° 46": a result deduced from the sup-
posed position of its axis, at an angle of 45°, with each of
the surfaces; and from other less reducing circumstances of ap-
parent harmony by simple reasons.

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 105° 28°; for the
inclination of the surfaces each other is found to be very
nearly, if not accurately, 105°, as it was formerly deter-
mined to be by Huygens; and since the measure of the
superficial 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.

Exposition of the Figure.

a b, Is the principal circle of the goniometer, graduated
on its edge.

b c d, The axe of the circle.

e, A milked head, by which the circle is turned.

f, A milked head on the small axe.

g, A brass plate supported by the pillar, and gradu-
ated as a vernier to every five minutes.

h, The extremity of a small spring, by which the cir-
acle is stopped at 180°, without the trouble of reading off.
i f, w e, Are two centres of motion, the one hori-
zontal, the other vertical, for adjusting the position of a
single point in the circle, by the handle f, the other by the milked
head m. The crystal being attached to a screw 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 milked head m, is next
rendered truly parallel to the axis, by turning the handle i
till the reflected image of a horizontal line is seen to be truly
horizontal. By means of the milked head f, the second sur-
f ace is then brought into the position of the first, and if the
reflected image from this surface is found not to be horizon-
tal, it is rendered so by turning the milked head m, and
since this motion is parallel to the first surface, it does not
derange the preceding adjustment.

Goni-
GONIOMETRICAL LINES, derived from \textit{goniometry}, or determining the quantity of angles. Such are lines, tangents, secants, vertical lines, &c.

We have a paper by Mr. Jones, in the Philosophical Transactions, containing a commodious disposition of equations for exhibiting the relations of goniometrical lines, from whence a multitude of curious theorems may be derived. See Phil. Trans. N. 2. 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 microscopic researches of Müller and Schrann, 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 stagnant water or in dunnghills.

Species.

\textit{Polysphecium}. Orbicular, pellucid, with innumerable spherical molecules. Schrann.

Found in stagnant water; the colour greenish-yellow, and general appearance that of a thin membrane filled with innumerable lucid globules. Very common in the month of July.


The molecules are oval and nearly of an equal size, their colour greenish, pellucid, and disposed in a quadrangular manner within the membrane, like diamonds in a ring; or rather, as Müller compares them, to the jewels in the breastplate 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.

\textit{Truncaturn.} 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 brightness in the middle. Its motion is languid.


The projection at the base of the body in this species is placed in a right angle; the interlines green, with the larger vesicle transparent.

\textit{Pleminatum}. Quadrangular, opaque, with four cylindrical protuberances. Müll.

This species, according to Müller, appears under a slight magnifier like a quadrangular membrane, plain on both sides, but, when a deeper lens is applied, resembles the figure of a bolster, 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 decurated, or divided into little figures by the intersection of straight lines. It is found in puddles under dunnghills.

GONKOFEN, or Gankofen, a town of Bavaria; 14 miles E. of Landshut.

Gonna, a town of Hindooscan, in Lahore; 12 miles W. of Nangorote.

GONNI, or Gonno, in Ancient Geography, a town of Greece, in the Peribabia, situated near Paeaus, towards the north where the Olympus and Ossa approached each other.

GONNOCONDYMMU, a town of Greece, in Macedonia, in the Peribabia.

GONNOLESSA, a town of Greece, in the Peloponnesus.

In the time of Pananias it belonged to the Sicyniata.


Gen. Ch. Cal. Pieranth inferior, of one leaf, in the deep, acute, spreading segments, permanent. Cor. of one petal, wheel-shaped, in five deep spreading segments. Nectary a leaf-like, crowning the flowers, lobed. Stem. Filaments five, thickish, united into a short tube; anthers bursting transversely, terminated by a membrane, their nectaries of pollen attached to the outer extremity, with respect to the cell, and covered by the stigma. \textit{Pf}. Germens two, ovate-oblung; illes two, very short, close together, stigma common to both, flat, flat or depressed, with five angles. \textit{Peric}. Pouches inflated, more or less angular or ribbed. Seeds numerous, imbricate, oblong, crowned with down.


This appears to be a numerous genus, properly separated from \textit{Cynanchum}, and consisting of climbing shrubs, with opposite broadish leaves, and flowers growing in umbels between the insertion of the foot-flalks. They are natives of America, chiefly within the tropics. Examples of it are \textit{Cynanchum maritimum}. Lim. Mant. 54. Jacq. Amer. 83. t. 56, a hairy plant, with dark-purple blossoms; \textit{faberfolium}. Limn. Sp. Pl. 310, figured in Dell. Hort. Edh. t. 229, f. 296, likewise a downy species, with purplish-green flowers; and \textit{cristiflorum}, Ait. Hort. Kew. v. i. 302. Plum. Edh. 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 \textit{G. macrophyllum}, \textit{hirfusis}, and \textit{levis}.

GONON BESAR, in Geography, a mountain on the E. side of the island of Java, famous for the quantity of pepper which its trees produce.

GONONG, or Gana, one of the group of Asiatic ifles, called \textit{Banda}, in which there is a remarkable volcano.

GONOR, a town of Hindoostan, in the cirear of Go- hud.

GONORHYNCHUS, in Ichthyology, a species of \textit{Cypora}, which fec.

GONORRHGEA, in Surgery, a disease in which a kind of matter, which is either actually pus, or a fluid of very similar qualities, is discharged from the urethra of the male subject, and from the surfaces of the labium, nymph, clitoris, and vagina of the female, attended with more or less heat, pain, and difficulty in making water. The disease is infectious, and capable of communicating the complaint from one person to another, whenever it comes into
GONORRHEA.

He remarks, that if a Greek name is to be retained, he would call the complaint "blennorrhagia", from δέλλον, mucous, and φασιν, to flow. Now this last expression is objectionable, on the identical principle which makes Dr. Swedaour with for the relinquishment of gonorrhoea; for it is generally thought by all the most eminent modern surgeons, that the discharge is pus, and not mucous. Besides, we do not see much utility in abandoning the ancient appellatio. The knowledge of surgery is now so highly cultivated, that there is not the least danger of any man imbibing 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 stand in equal, and often greater, need of alteration?

The Hunterian doctrines go so far as to assert, on the authority of experiments, that the poison of the lues venereus, and that of gonorrhoea, are in fact the same, though usually productive of opposite effects, by reason of the parts affected, and those concerned in gonorrhea 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 seething fenstration in making water, which would constitute a gonorrhoea, may be the consequence of any thing which produces irritation in the passage without the possibility of the venereal or common gonorrhoeal virus being at all concerned. Thus, a man may have a lacerity, and begin the employment of boughies for its cure; their irritation may bring on a forehead in 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 unequivocal, mechanical, irritation of the boughies. 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 boughies to have connection with a woman, there is no doubt that the latter would be very likely to become troubled with a discharge and seething in making water, merely in consequence of the application of same of the matter from the male urethra to the surfaces of the labes, mons, &c.

The arguments which have been adduced to show the poison of one form of gonorrhoea, and that of the venereal disease, are the same, will presently 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 fermen, the term being derived from γονος, signifying the seminal fluid, and ρηθος, to flow. The ancients are said to have entertained the very erroneous notion that the disease consisted of an oozing of the fermen in a morbid and altered state. As it is long since so absurd a supposition has had any partisans, a refutation becomes superfluous and every one now knows, that in the present, as in many other examples, truth and etymology are not coupled together. Dr. Swedaour, who has found fault with the term gonorrhoea, as conveying an untrue idea, has not been happy in a substitute.

When the inflammatory symptoms have come on, the penis seems swollen, and as if it were in a state of half-erection. The glass appears red, smooth, and enlarged, with a kind of transparency about it. Sometimes it is affected with a slight excoriolation, 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 stream of urine. Indeed, very frequently, this fluid can only be discharged in a broken furred 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 internal surface of the penis, in the course of the urethra. These swellings have been considered as the mucus gland of that canal in a furred 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 closure 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 primis. See Fistula.

A painful fenstration is frequently felt by the patient along the lower surface of the penis, extending as far as the anns, 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 foreboding exists along the track of the urethra towards the anns, or when the complaint is complicated with chordee. See Chordee.

The vicifous transparent fluid which is naturally secreted by the glands of the urethra changes into a thick aqueous liquid,
lilory, 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 dilution of the parts by which the matter is formed. Sometimes it is white, sometimes yellow, sometimes of a greenish colour. Such varieties 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. Svedius injected into his urethra some caustic volatile alkali mixed with water, by way of experiment. The usual symptoms of a gonorrhoea ensued, together with a discharge which had the same appearances and alterations of colour, as the matter of the gonorrhoea virulent. We have already stated that the same circumstances most frequently attend the employment of bougies.

In the generality of inflations, 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 prostate, and the vesicles feminines. 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 accelerators or urine muscles. Therefore it seems rational to conclude, that if the membranous and bulbous parts of the urethra, Cowper's glands, the prostate, and the vesicles feminines, 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 accelerators urine are affected with spasmotic contractions, which are particularly dispoled 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 vesicles 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 inconsiderable in quantity, and only just sufficient to give a red colour to the matter. The erections, 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 patient. The inflammation, accompanying a gonorrhoea, 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 pulmonary 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 gonorrhoea is commonly moderate, there are inflations in which it is exceedingly severe, and extends into the reticule 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 chordee. 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 disease extends in ordinary inflations, 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 gonorrhoea. 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 fact of this case, nor which the patient complains, nor the irritation of the parts, corresponded to the real seat of the disease. The neighbouring parts are often affected with a variety of symptoms, of a nature more or less feverish, such as uneasiness, and even pains every where about the pubes, scrotum, perineum, anus, and hips. It is often necessary to suspend the teffules, which become so irritable, that the leaf 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. Cakes also occur in which the irritation extends to the buttocks, thighs, and abdominal muscles, occasioning acute pain, swelling, and extreme forceps 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 bleed, 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 gonorrhoea; but the violence of the essentia] 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 continue.
fine itself to the specific disease, but reaches all along the urethra. Severe pain is also frequently experienced in the perineum. Sometimes the acceleratores urinæ muscles are affected with the spasmoidal 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 erecære muscles. Sometimes the inflammation is so great as to occasion a swelling, and even an abscès 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 infirmities, 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 distressing 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 gonorrhœa; and others have observed a violent inflammation of the kidneys from the same cause. (See Encyclopædia Méthodique partie chirurgicale, tom. i. p. 584.) It has already been mentioned that a chorea 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 spasmoidal nature.

When the inflammation is not confined to the urethra and its glands, but spreads further, it attacks the sub stance of the corpus spongiosum, where it occasions an extravasation of coagulating lymph, which, unifying the cells together, makes the urethra incapable of yielding and being stretched in the same degree as the urethral caverns. Hence during an erection, the penis becomes bent forward. The adhesion of the cells of the corpus spongiosum urethrae together, which is the cause of chorea, 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 chanteres. A chorea often continues after all the other symptoms of a gonorrhœa have quite ceased.

A chorea is sometimes altogether spasmoidal, 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 chorea 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 infirmities 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 loin, colic pains, nausea, flatulence, disorders of the digestive organs, &c.

The swelling of the testicle is noticed to take place remarkably often just when the pain in the urethra hassubsided, and the discharges has stopped; 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 discharges, 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 suppressed; and, indeed, it is remarked, that the stoppage 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 part 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 haus veneris was seldom the consequence of this difease. However, this argument will have no weight with those practitioners, who disbelieve in the doctrine that the poisons of gonorrhœa and the venereal disease are of the same nature. Another consideration, which influnced 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 of their absorbents, and of the glands to which such vessels run. Now, since the lymphatics and their glands usually inflame before suppuration has taken place in the part originally affected, and their inflammation often subsides as soon as this late 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 chanteres very frequently suppurate, burst, and turn into supplicative ulcers. It is true, however, that swellings of the inguinal glands, induced by the irritation of gonorrhœa,
do sometimes end in abscesses and frost; but no lues venereal follows, nor is mercury requisite for the cure.

Another sympathetic affection, sometimes attending 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, painful cord, which, proceeding from the prepuse, extends along the dorium 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 suspicion 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 supposed, that the matter which is discharged from the urethra, in cases of gonorrhoea, 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 gonorrhoea 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, in which he had seen, where a large quantity of pus had been formed upon the surface of the visera, without any ulceration of these parts whatsoever. In 1753, his brother, Mr. John Hunter, had an opportunity of dissecting the bodies of two male infants, who were executed, while it was known that they were affected with a fever gonorrhoea. After a most careful examination, no ulceration could be discovered in 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 gonorrhoea 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 lumen were frequently filled with pus. Morgagni is said to have remarked the same fact. (De Sedibus et Causis Morborum. Epit. 44. &c.)

As an attempt has been made by a late writer, Dr. Svediaur, 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 gonorrhoea 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 fore, occasioned by the bursting of an abscess in one of the glands of this passage, 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 fores as were fancied to be the cause of gonorrhoea.

We shall now consider the identity of the gonorrhoea and venereal poisons. It has been represented by some surgical authors, that the essential difference between gonorrhoea 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 generaliism 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 their 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 asserted, that the venereal disease and gonorrhoea 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 Alfrue, that at the time when he wrote, gonorrhoea 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 gonorrhoea were unknown before the landing of European navigators, but where these maladies were afterwards difubstanced, gonorrhoea was not noticed till several years after syphilitic disorders had begun to flow themselves. Claps are said to be 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 diseases, and that from which gonorrhoea has its origin.

On the other hand, 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 class of reasoners; for, he observes, that it is almost impossible for a man to have a chance during a voyage of several months, without the whole of the penis being destroyed, while it is well known, that a gonorrhoea 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 gonorrhoea, went up the country and got well; but that when the consequences of the malady was the venereal disease, the latter was incurable. Hence it is inferred, that the complaint which the Otaheites contracted was the gonorrhoea, 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 fores, it is contended, that they would likewise have understood how to cure other venereal symptoms. We find, also, from the perusal of captain Cook's third voyage, that the venereal disease afterwards raging in all its forms in the island of Otaheite. Now, since there is no document to show, that the gonorrhoea 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 gonorrhoea.

Mr. Hunter mentions a gentleman who had a gonorrhoea thrice, of which he was cured without mercury. About two months after each infection, he had symptoms of lues venereal. The slight were ulcers in the throat; the second, were blemishes on the face; both which forms of the disease yielded to mercury. Thirdly, two punctures were made on the penis, with a lancet dipped in the matter of a gonorrhoea. One of these produced, on the part of the prepuse where it was made, a red, thickened speck, which increased and discharged some matter. This suppurated chancres healed on having its surface repeatedly destroyed by caustic. The other puncture was made on the glans, where it was followed by...
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by a pimple, full of yellowish matter. This pimple was touched with cautery, 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
clitoris, a bubo formed in the groin. A sufficient quan-
tity of mercury was given to cure the gland locally, but not
to prevent the constitution from being affected. 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 so soon
as the fore was trimmed over, in order to see what parts
would next be affected.

About three months afterwards, copper-coloured blotsches
made their appearance in the arm, 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:

II. It is impossible to say what time may elapse between
the application of venereal poison to the penis, and the com-
menecement of ulceration. Therefore, Bougainville’s sailors,
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 argu-
ment adduced 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
moral or matter, beneath the euticle, will undoubtedly pro-
duce troublesome local complaints, may we not doubt that
the fores, in the above case, were actually venereal ones?
Can we not equally depend on the continence of the subject
of the above remarkable experiments, during the long space
of four months, between the healing of the fore 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 unsatisfied. How much more conclusive
in this respect, the experiments would have been, had the
inoculation been practised 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 glands 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-
quently cause a gonorrhoea? If the infection of gonorrhoea,
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-
infected countries, than in other situations where it has been
a considerable time establish. 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
flown itself in much worse shapes. The same class of
reasoners also affect, 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, regarding the point, whether one of them
actually existed a long while before the other. As we shall
have occasion to treat of the origin of the venereal disease
henceforward (see Louis Venereus), we shall not enter into
this disquisition in the present article. We may, however,
express our opinion, that discharges from the urethra must have been occasioned 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 certain remain doubts;
but, that there are ulcers or discharges which arise from
no poisonous 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 could have been liable to
various kinds of irritation.

One argument adduced against the identity of the virus,
is derived from the striking difference observable in the
progress and symptoms of the two diseases. When the
venereal disease is neglected, it always grows worse and
worse, and sooner or later brings on the patient’s dissolution.
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 poison, however,
contend, that, in order to account for this last fact (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 abscess 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
remains 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 genera-
ing impurity in gonorrhoea. The partizans of the decti-
time which imputes this latter infection to the venereal
virus, acknowledge, that things do usually correspond with
the statement just now given: but they affirm 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 particu-
larly careful to keep the glans and prepuce clean, chan-
cres are very apt to form upon these parts, and by one chan-
cre the whole system may become infected. It is also
asserted, that, independently of the formation of any chan-
cres, there are cases proving, that the venereal disease may be
the consequence of a gonorrhoea, and that every inci-
dent practice must meet with influence of this kind. Ob-
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tensive practice must meet with influence of this kind.

With respect to chancres arising from the matter of
gonorrhoea being in contact with the glans and prepuce,
we do, undoubtedly, for men and women who have
claps and chancres together; but, in our opinion, it is more rational to impute the fore to the application of venereal pus from chancres, together with the gonorrhœal 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 occur in the same patient. We ought naturally to expect, that when a gonorrhœa makes its appearance first, it would always be the cause of a chancre; and that when a chancre is the first symptom, it would invariably be the occasion of gonorrhœa. We diffimit from present consideration the affection of such writers as defend the identity of the virus, that, in some few instances, one malady does become the cause of the other. Mr. Hunter suspected, that the irritation of one of the parts, forming the seats of the two diseases, became the precursor of the other. He thought, that when the urethra inflames and discharges matter, the adjacent external parts might, on that account, be exempt from a disease which they would otherwise necessarily contract, by reason of the effect of the virus which gave rise to the gonorrhœa. The same celebrated writer also entertained a suspicion, that when a chancre attacks the glans, or prepuce, the urethra might become incapable 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 theoretical. We are of opinion, also, that in arguing in this way, the advocates for the identity of the virus only bring forward the shadow, instead of the substance of reason. In fact, they lay 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 gonorrhœa, because a chancre already occupies the external parts. If this reasoning be not hypothetical and fanciful, we cannot conceive what arguments can ever be confidered so. They who talk in this manner, inadvertently 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 gonorrhœa neglect to keep the glans and prepuce clean; yet, according to their principles, a clad renders the external parts incapable of infection, and, of course, there would be no need of cleanliness as a preventative. We think that the weakness of the argument must be obvious to the youngest reader, 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 chancres and gonorrhœa.

The different treatment required by gonorrhœa and the venereal disease, is another argument against the identity of the virus, mercury being unnecessary in claps, and the pole specific in the other complaint. The partisans of the opposite opinion endeavour to diminish the force of this fact, by advertizing to the different ways in which the two diseases affect the parts which are attacked, and by maintaining that no just inference can be drawn from the difference of treatment, 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 gonorrhœa, when used in the same way as for other venereal affections, yet, when applied to the female sex, serves to moderate the symptoms, and accelerate the cure.

Having seen the calomel injection employed in some hundreds of cases, with less benefit than the common viridical one, we cannot assert to the last observation. 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, between 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 cause and the first appearance of the effect. The time when a gonorrhœa 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 shew itself till the end of five or six weeks. There are also cafes to be met with, in which the disordor begins at all the intermediate periods. It is calculated, that the most common time of its origin is in the space between the sixtieth 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 irritation, and uncommon sensation, in the parts. Hence, this celebrated author concluded, that the virus feldom, or never, remains so long inactive; but that the inflammatory state may 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 gonorrhœa do not begin for five or six weeks after infection, and yet are not preceded by any remarkable symptom whatever.

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 whatever is assignable. Such infames as occur independently of a specific gonorrhœal, or, according to the Hunterian doctrine, the venereal virus, have been termed simple or benign. Some affect, that these cases may be known by their coming on immediately after coition, and it is violent from the very beginning; while the virulent gonorrhœa does not commence till after some days, and grows gradually worse. However, this criterion is insufficient: simple gonorrhœas are not always owing to coition, nor are they always sudden in their appearance.

Mr. Hunter has seen the urethra sympathize with the gums in dentition, and all the symptoms of gonorrhœa affect the same infant several times. The author of the article Gonorrhœa, in the Encyclopédie Methodique, also mentions his having seen two female children, who were affected during dentition with a discharge from the pudenda, attended by a certain degree of inflammation, and pain in making water.

We shall now introduce a few remarks on the effect of the discharge on the parts producing it.

It was formerly not an uncommon opinion, that the discharge 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 to make the suppuration could wash away all the poison, causing the original irritation, yet, as all the matter 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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The foregoing opinions do not rest altogether upon theory; they are also founded on 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 corrobororation 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; and consequently, if this be true, the infection of her last 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 say 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 afforded, because they are also liable to a complaint, called the flor albus, which has some resemblance. A mere running from the parts is not so 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 disease will often exist, 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 flor albus frequently puts on all the appearances of gonorrhoeal matter. Neither is pain, nor any peculiarity in the sensations of the parts, necessarily attendant upon 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, such as an increased discharge, pain in making water, foemen, &c. and yet he could perceive 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 unfaithful, and from her power of communicating the disease to others. However, it is acknowledged,
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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 endowed with considerable sensibility. Frequently, however, the complaint extends much further, producing disagreeable sensations and forms of the inside of the labia, nympha, clitoris, carunculae myrtiformes, and meatus 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 fore 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 fulness 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 suppurate, 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 fluids 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 in 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 surgeon 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 persons all got well; but Mr. Hunter thought that some of them were not cured quite so soon 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 first 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 distance, the local applications may be either of the irritating or soothing kind. In this example, irritating applications may be less 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 therefore 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 symptom.

When the itching, pain, &c., are felt for some time before the discharge appears, Mr. Hunter rather prefers the soothing 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 fœtures, and of discharged fetidness, 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 medicines, every practitioner supposing that he is in possession of the bell. Some use mercurial evacuants; whilst others carefully avoid mercury in every form. The neutral
neural falls 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 evacuants acting mechanically upon the urinary passages, so as to wash away the matter; secondly, as specifics. For this purpose, nitre has been given, a medicine which has always been thought to have great effect in lefTing inflammation, though Mr. Hunter had 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, must, 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 cures where a brisk purgation 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 for two months, and by taking at once ten grains of calomel, which purged him most violently, he was almost 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 circumstances 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. The 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 form of a secretion from one part, do to an inflammation of another part? On such a supposition would not a sweat, or an increase of saliva, by chewing tobacco, or stimulating the nose by snuff, all tend equally to cure a gonorrhœa? But humours having been considered as the universal cause of every disease, especially those in which pus is formed, or a discharge produced, and purging having been supposed to be the cure for humours, purgatives were 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 a 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 knew a gonorrhœa take place while under a course of mercury insufficient 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 go-

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norrhœa when loaded with mercury for the cure of a lues venerea; the gonorrhœa, nevertheless, has been as difficult of cure as in ordinary cases," P. 72, &c.

With respect to diuretics, considered as evacuants, 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 composition (if we had such), and passing off by the urine, might act upon the urethra in their passage through it. The ballasts and turpentine past off in this way, and become specifics 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 attendant 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 would for this purpose, or water joined with such things as encourage the patient to drink a good deal, as with tea, capillaries, or gripes, &c.

Allringuts have frequently been prescribed, 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 liquid ones; but in general they create irritation. They must be used in the form of a bougie, which Mr. Hunter imagined was commonly injurious, when the parts were in an inflamed state, though he confesses, 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 strong corroborative 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 too often, as it may be productive of bad consequences.

The same author observes, that many injections remove the
the symptoms immediately, or soon after the application, and prevent the formation of matter, which has given rise to the notion of their shutting up the diæse and driving it into the constitution; but this supposition cannot be true, since the matter is the only subsistance 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 aborption; so that there can neither be 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 fort 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 gonorrhœa, by which means the halt is destroyed and the diæse 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 bougies, as well as many injections, may be supposed to perform a cure; and although they increase the symptoms for a time, they never can increase the diæse 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 diæse. 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 cases 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 diæse in the same person sometime teaches us. Neither should these injections be used when the irritation has spread beyond the specific distance; when the tefficles are tender, or when they have become more upon a sudden diminution of the discharge; when the perineum is very injuriable of inflammation, and particularly if it should have formerly suppurred. 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 cases they do no good, and often do mischief: Mr. Hunter thought he had seen abces 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 diæse 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 (hydrargyrum 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 thus weakened should give considerable pain, or occasion a great increase of foremen 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 diæse itself, but by lessening the diæse 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 (acetate 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 infusions 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 foremen 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, observs 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 diæse, when it has become mild and the parts begin to itch. However, if the diæse 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 lessening, 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 balsams, and the turpentine, dissolved in water; the juices of many vegetables, as oak bark, Peruwyn bark, tormentil root, and, perhaps, all the metallic salts, as green, blue, and white vitriols; 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 gonorrhœa.
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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 turpentine lotion.

When any of the glands of the urethra remain in an indurated state, after the subsidence of the inflammation, the hardness 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 disease itself is milder, and the secondary symptoms less 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 feat 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 caufe 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 dried like a sore. The ulcer, however, is not regarded as venerial. Though Mr. Hunter entertained such a sentiment, and directed a corresponding treatment.

In pellitory constitutions, the symptoms are frequently violent, attended with a strong propensity to the inflammatory fever. The inflammation, however, does not extend beyond the specific distance. 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 opaque gyotiers, after a short 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 distance, 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 a 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 gonorrhea 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 gonorrhea, 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 same writer represents, that, unfortunately, there are cases in which no known method lessens the symptoms; evacuations, a strengthening plan, sedatives and emollients, all prove ineffectual, and time alone seems to bring about the cure. In these instances, Mr. Hunter thought the soothing plan of treatment the most advisable, and was against the employment of astringents. Neither had he much opinion of the capivi and Canada balsams, nor of turpentine in general, though they might diminish the discharge.

A gonorrhea is also considerably affected by the patient's way of life, during the inflammatory state. Most things which hurry or increase the circulation, aggravate the symptoms, such as violent exercise, drinking strong liquors, eating strong indigestible food, taking peppers, pipes, spirits, &c.

When the complaint begins mildly, or after the violent symptoms have subsided, we may prescribe medicines which will afflict the above local remedies, in checking the discharge. Mr. Hunter thought the turpentine the most efficacious. Cantharides, cuprum vitriolatum, acetic acid, and galum, have also been recommended.

The reader is already aware, that Mr. Hunter regarded gonorrhea as a disease arising from the venereal poison, and believed that the matter from the urethra, if introduced into the circulation, would occasion a flux venerea. 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 at an end. He advised a grain of the hydrargyrum caelestum to be taken every night, or every evening and morning; but frictions, with the mercurial ointment, when mercury disagreed with the stomac.

Many practitioners at this day are strongly attached to the sylen of prescribing a grain or two of calomel every day during the treatment of a gonorrhea, 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 alternative and purgative. We never have seen any reason, however, for exhibiting either the hydrargyrum caelestum, 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 vesicles 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 eruptions. Cistota 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, lodging from the arm is often of service, but that it is more immediately useful to take away blood from the part itself by beeches. Great benefit often follows the accidental burning of a vesel, and a profuse hemorrhage. Relief is often ob-

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tained from expelling the penis to the stream of warm water. Poultices and fomentations, especially those containing 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 relieves the pain and prevents erctions, 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 if in one case considerable benefit seemed to result from giving canta, after the common methods had failed. Electricity, he says, may also be of service. A chordae 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 been the kind of chordae, 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 cleaner; 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 abcess, when Cowper's glands suppurate, in order to prevent the matter from making its way into the urethra or ferotum.

When the bladder is affected with irritation, in consequence of gonorrhea, opiate clysters, 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 constitutions, is hurtful, and should always be referred to with caution. When the complaint lasts very long, restifing ordinary methods, Mr. Hunter suggests 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 Homerals.

The decline of a gonorrhoea 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 tense of weariess about the loins, hips, testicles, and ferotum is no longer felt; and the cherry-like appearance of the glans penis gradually subsides. The running diminishes, or at all events becomes whiter, then paler, and by degrees assumes a more flimy consistence, in proportion as it becomes more like the natural secretion, which is designed to lubricate the urethra.

Recurrences of the discharge every now and then are met with, after the pain, discharge, &c. have quite ceased. Such relapses, however, are more common in women than men, and the complaint is usually in a milder form than before.

GONRA, in Geography, a town of Hindoostan, in Bundeloud; 20 miles N. of Callissing. GONS, a town of Hungary; 22 miles S.S.W. of Zatmar.

GONSAVO, 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 Granada. He was afterwards employed to succor 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 successor, and making a partition of the country with Lewis XII. of France, and Gonvaldo 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 successes, and wishing to swell his moderation, Gonvaldo 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 priour into Spain. The partitioning powers soon disagreed 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. Gonvaldo was now compelled to retire with his army, delitate 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 successes of Gonvaldo, such was "Spanish honour," that he refused to sign it, and the French were, by the efforts of Gonvaldo, 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 gifts of honour. He was made confable of the kingdom of Naples, raised to the dukedoms 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 eluded upon different pretenses. The king determined to go to Naples, and was met at Genoa by Gonvaldo. 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 Savona they had an interview with Lewis XII. when he bowed his obeisance for Gonvaldo, by decorating him with a gold chain taken from his own neck, and causing him to sup 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 1515, at the age of seventy-two. Gonvaldo 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. Univer. Hist. Moretii.

GONSAVO, St., in Geography, a town of Brazil, in the government of St. Salvador; 40 miles W. of Sergipe.

GONTAPILLY, a town of Hindoostan, in the circuit of Ciacile; 25 miles S. of Cossimotta.


By Loweree's description of his own species, G. amariflora, a shrub with pinnated hairy leaves, and by his reference to Rumph. Amboin. Append. t. 15, it should seem to be allied to Epigera, and the description of the pill and fruit does not exactly answer. It agrees perhaps better with Brasenia. Juss. 373, both in botanical characters and medical properties; see that article. Loweree says his plant is found in the woods of China and Cochinchina, and that
the virtues of the root and fruit are diaphoretic, alexiteric, antifebric, and anthemimtic. He adds, that "it seems to be the same drug which the Portuguese call radice de Solor, because it grows in the isle of Solora, as well as in Timor, and which is in great use in India." Is the Branca, after all, an Indian plant?

GONWA, in Geography, a town of Hindooftan, in Guzerat; it is 20 miles N.W. of Amoog.

GONYALGIA, of 500, lives, or 5/6\% pain, a term used by some authors to express a violent pain in the knee.

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, Lema, in the Paro and Efearial, till 1617, when he was made painter to the court, in the place of Fabricon Cellado. His portraits are admirable, especially the six whole lengths with the date 1621, possessed by the baron of Cana Davallino. In history, his style was ornamental; his drapery, a varied imitation of life, by its illusion captivated the vulgar, whilst it destroyed the dignity, simplicity, and generally the costume of the subject. He died in 1627, not, as Palamino states, in 1611. Fufeli's Pilkington.

GOOBER, in Geography, a country of Africa, S. of Wanga, between 10° and 12° N. lat. and 15° and 20° E. long. The mountains of Komri, so called by Abulfeda, commence in this territory.

GOOCHLAND, a county of Virginia, in America, surrounded by Louisa, Flavanna, Henrico, Hanover, and Powhatan counties; about 40 miles long and 14 broad, and containing 4803 free inhabitants, and 4803 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. Bonum fis, 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. Bonum communis, 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 per se, is the essential 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 substance is good, or perfect, as it has all the essiential attributes of thought; if an extended substance 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, fo 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 transcendent natural goodnes, by congruency with the divine will, which, they say, constitutes the measure of all real goodnes.

Good, Physical or Natural, is that whereby a thing possesses all things necessary to its Gute effe, 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, beside absolute physical goodnes, there may be a relative one; as in foods, which 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.

3 M 2 Natural.
Natural good may be otherwise defined to be that which makes or denunciates 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.

Good, 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, defined, 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, benevolent, juridical, and utilitarian.

The first, bonum benevolentium, 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 commodas, convenientias, not goods.

Bonom juventatis is that which is good, as it tends to give us pleasure, and is defined on that account; but without any repugnancy to virtue or right reason; as music to the ears, painting to the eyes, &c.

Bonom utilitarum, or commodarum, is that which is good on account of something else for which it is defined; as money, riches, &c.

Good, chief, supreme, or suprema, summun bonum, is that, the enjoyment of which renders men truly and completely happy. The schools distinguish this chief good of man into that which is simply and adequately so, 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 felicitas viarum, and the former felicitas comprehendens.

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, accommodative to all places and times, durable, self-derived, and indestructible; and this confides in the sentence of Harris, in respect of conduct, or in living perpetually feelling, as far as possible, what is congruous to nature, and rejecting what is contrary, making our end that feeling and rejecting only. Three Treatises, Sc. 1765, p. 121, &c. 265, &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 Aristotle 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 sumnum bonum: but the Stoics ascribed farther, that virtue was the only good; whilst the Peripatetics denied, with reaon, that virtue was self-sufficient, and therefore required several other things as auxiliaries, such as health, prosperity, friends, &c. which are to the virtuous man in the nature of instruments or ornaments to his felicity. An excellent writer lays down the following criteria or characteristics of the sumnum bonum, or chief good, which reaon 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, is not prevented in its operation by some other thing which keeps him from reifying 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 fake of this; and it must be sufficient to furnish a happiness adequate to the capacities of human nature, and of 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 instrument 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 Epicureans, Peripatetics, and Stoics.

Good-will, See Benevolence. Good Works. See Merit and Supercerogation. Good Steering, bona gestia, in a Late Style, is particularly used for an exact carriage or behaviour of a subject towards the king and his liege people; to which some men, upon such instances, are bound. The juries are empowered by 34 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 bonos mores, as well as contra pecunias; as, for haunting base-dungeons; 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, eavesdroppers, such as keep infamous company, or are reported to be piphers or robbers, common drunkards, whores-mothers, 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 forfeitures, in a recognizance or obligation to the king, entered on record, and taken in some court, or by some judicial officer, whereby the parties acknowledge themselves to be indebted to the crown in the sum required, e. g. 100l. with condition to be void of none effect, 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 recognizance, 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 recognizance becomes forfeited or absolete; and being effaced or extracted, (i.e. taken out from among the other records) and sent up to the exchequer, the party and his forfeitures are become the king's debts, and are fixed for the several sums in which they are bound. All persons under the king's protection may obtain such security, upon due cause shown; and the justice may be compelled to grant it by a mandatory writ, called suppliatio: 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 recognizance 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 juries. He that is bound to this, Lambard says, is more strictly bound than to the peace;
GOODENOVA, or Goodenovia, like, not 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, a most valuable paper on British Corices, in the second volume of the Linn. Society's Transactions, and of one on British Fuci, in conjunction with Mr. Woodward, in the third. The name was constructed after the example of Tournedort, who, as he tells us, not without much consideration, contrived to form *Genula* out of *Gundelfsheimer.* It did not occur to us at the time that *Goodenovia* 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, Stilligia after Mr. Stillingfleet, and these are sufficient precedents. Sm. Tr. of Linn. Soc. v. 2, 346. Brown. Prodr. Nov. Holl. v. 1, 574. Willd. Sp. Pl. v. 1, 954. Mart. Mill. Dict. v. 2. Clas and order, *Pennantia Monogynia.* Nat. Ord. Compances, Linn. Compances. Jull. Goodenovia, Brown.

Gen. Ch. Cal. Perianth superior, of five, nearly equal, linear leaves, permanent. Cor. of one petal, much longer than the calyx, irregular; tube flat from top to bottom at the back; limb of five deep, firm, lanceolate segments, with thin dilated longitudinal borders, turned moist to one side, forming one lip, or generally two. Stam. Filaments five, shorter than the tube, often projecting through its slit, capillary, equal; anthers vertical, oblong; of two lobes. Pijf. Germin inferior, oblong, crowned with the calyx-leaves, which run down its sides and form ribs; stile 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. *Peric.* 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, flat longitudinally at the back; limb in five deep segments turned one way. Anthers separate, beardless. Stigma with a cup-shaped fringed intragum. Capsule inferior, of two or four cells, with a parallel partition. *Seeds* numerous, imbricated. Obf. Mr. Brown has remarked, in some species, a small bag of honey attached to the germen, opposite to the slit 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 Cavanilles and Brown to other genera. These are the *albida,* *fritha,* and *ramosiflora,* the latter, which, like the *albida,* is a *Scevola,* may be seen in Sm. Bot. of N. Holl. t. 5. The *fritha* belongs to Mr. Brown's *Dampiera.* 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 four of them have yellow flowers, the rest 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 last properly belong to the genus. One of them is *Sellbrera radicans.* Cavan. 1. t. 474. f. 2. *Goodenia repens,* Billard. Nov. Holl. t. 76.

Satisfactory examples of the genus are, *G. paniculata.* Sm. n. 2. Cavan. 1. t. 507. This has yellow flowers in terminal panicles. Leaves mostly radical, strongly toothed. *Herbage* hairy. *G. stellata.* Sm. n. 1. Cav. 1. t. 506. Andr. Repol. t. 68. The perianth in five flowers that flowered in England, and from which the genus was described. This has rather a thorny *flame,* ovate nearly serrated smooth leaves, and axillary forked flasks, bearing elegant yellow flowers. It is a desirable ornament for a greenhouse, and not difficult of culture.

*G. grandisflora.* Sims in Curt. Mag. t. 890. Differs from the last in being downy, with lyrate leaves and larger flowers. Whole tube is split into four segments, and singularly rough or bearded within.

*G. elongata.* Billard. Nov. Holl. t. 75. Is a very slender species, with long simple flower-flanks definite of bracteas.

GOODENOVIÆ, a natural order of plants recently established by Mr. Brown, Prodr. Nov. Holl. v. 1, 573, being separated by him from the *Campanulaceae* of Jullien, and essentially distinguished by a peculiar cup-shaped intragum, either undivided or two-lobed, 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-cleft, sometimes five or six deep divisions, sometimes short, undivided, and occasionally obsolete; 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. Limb in five deep segments, compounding one lip or two, their disk lanceolate, flat, their sides, or wings, of a thinner texture, elevated, folded inwards when young, rarely obsolete or deficient.

_ Stamina_ five, unconnected with either corolla or stile, and alternate with the divisions of the former. Filaments distinct. Anthers either separate or cohering, 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 rudiments of the seeds either indefinite or definite, erect; sometimes bearing a gland between the two anterior filaments. Style one, simple, very rarely divided. Stigma fleshy, obtuse, either undivided or two-lobed. Encompassed from beneath with a somewhat membranous, cup-shaped, entire or two-lobed intragum, 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 valve, which are either undivided or cloven, bearing the seeds on its middle. When the number of the seeds is definite, one being in each cell, the pericarp is a drupa or a nut, rarely an *arillicula* (or membranous undividing capsule), bearing the seed from its base.

*Seeds* often with a thickish coat, sometimes with a hard
shell. Albinous fleshly, shaped like the seed, seldom wanting.

Embryo straight, about as long as the albumen. Cotyledons of a middling size, often leafy. *Plumula inconstipacious.*

These plants are either herbaceous or shrubby, not milky, chiefly found in the southern hemisphere, rarely within the northern tropic. Their pubescence when present is generally simple, sometimes glandular, rarely fimbriated. Leaves scattered, without stipules, simple, mostly undivided, sometimes lobed, often toothed. Inflorescence terminal or axillary, various. Flowers distinctly, very rarely aggregate, yellow, blue or purplish, seldom reddish.

The first section, with indefinite seeds, contains six genera; *Goodenia, Calegania, Euthalia, Villa* of Smith, *Lathanuilla* and *Authroianus*; the second, with definite seeds, three genera; *Sparoa* of Linnecus, much augmented, *Diaphora* and *Damiera*; the third section, with a fingle-seeded *urticales*, is contrived to admit the *Buuunia* named after the worthy and intelligent author, by Dr. Smith in the twelfth volume of the Linnean Society's Transactions not yet published. The place of this genus in a natural order is extremely difficult to determine. It agrees with the *Goodewia* chiefly in having an integument to the stigma, but in habit, aggregate flowers, four distinct bracteas, and some other marks, agrees with the *Dipsacea* of Jussieu, to which it is referred, not without doubt, in the Linnean Transactions. It consists of two species, *Buuunia fricera* and *aunulata*, herbaceous plants, with the aspect of single-leaved *Scaequalia*.

**GOODEROE, in Geography, a town of Abyflinia; 94 miles S.S.E. of Minic.**

**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 abundes with cocko-nut trees; the coast affords no anchorage. S. lat. 16. E. long. 174° 15'.—Also, the name of a Danish colony in Wett Greenland. N. lat. 64°.**

**GOOD Hope, Cape of. See Cape.**

**GODIA, in Botany, in memory of Dr. Peter 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 fatigued with his merits, that he has long defined a genus to his honour.**—Salif. Parad. Lond. t. 41. Sims. in Curt. *Mag.* t. 938.—Clais and order, *Diasphea Decandria*. Nat. Ord. *Papilionaceae*, Linn. *Leguminoses*, Jaff.


Eff. Ch. Calyx two-lipped; the upper cloven, broadest and shortest. Legume filated, compressed, flat at the upper edge, of one cell. Seeds two.

Obf. This genus, as Dr. Sims observes, ought to be placed next to *Bussus*, Tr. of *Linn. Soc.* v. 9. 502, from which it differs essentially in its legume, which has no dilated thickened borders, nor is it internally spongy nor many-celled. The stamens are truly diaphibous, in which it differs from *Catralaria*, as also in not having an inflated legume, though its habit comes nearest to that genus.

Two species are known.

1. G. *latifolia*. Curt. *Mag.* t. 958.—Leaflets smooth, as well as the branches and flower-tilts.—Native of Van Diemen's land. One of the first New Holland plants raised in this country, and very hardy in the greenhouse, possibly able to bear our climate. Mr. Atten we favored us with specimens from Kew in 1796. It is a delicate smooth *frub*, with ternate somewhat glaucous leaves, and terminal clusters of numerous yellow flowers, the base of which is white; and part of the wings, are flayed 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 fed only is usually perfected.

2. G. *pubescens*. Curt. *Mag.* t. 1310.—Leaflets downy, as well as the branches and flower-tilts.—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, though its downiers, often a variable circumstance, affords the only specific character. The leaflets in the plate do not answer to his definition of obcordate, and we believe they vary in shape, as in many leguminous plants.

**GOODIANELLI, in Geography, a town of Hindoostan, in Myore; 19 miles N. of Seringapatam.**

**GOODIMANELLE, a town of Hindoostan, in Myore; 20 miles W. of Bagalore.**

**GOODINGAR, a town of Hindoostan, in Tinewely, near the coast; 50 miles S. of Panemtotta.**

**GOODLUCK BAY, a small bay in the strait of Mageland, 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 goodneces 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 beneficial. No productions of nature display contrivance fo 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 flated 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 do not exist; 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 implements of husbandry, you would hardly lay of the sickle, that it is made to cut the reaper's hand, though, from the construction of the instrument, and the manner of using it, this mischief often follows. But if you had occasion to describe
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 sear
the sores of the feet. Here pain and misery are the very
objects of the contrivance. Now, nothing of this fort is to
be found in the books 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 pro-
duce pain and disease; 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 secrete the humour which forms the coat; if by chance
he come at a part of which he knows not the use, the most
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 nec-
"essary for any other purpose, or when the purpose, so far as it
was necessary, might have been effected by the operation of
down.” There is a class of properties, pertaining to animals,
which may be said to be superadded from an intention ex-
pressly 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 con-
tracted; and that is, of capacities for pleasure, in cafes,
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
pleasure. 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 pleasure as well as to preservation;
drew 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
graces, 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 condition,
which is calculated for the purpose. We have many internal
sensations of the most agreeable kind, hardly referable to any
of the five senses. Besides these there are exercises of the
understanding in volition, &e. of the imagination, and of
other faculties of the mind, which furnish unmixed gratifica-
tions, without any counterbalancing pains. Whilst the
above-mentioned propositions can be maintained, we are au-
thorized to ascribe to the Deity the character of benevolence
and what is benevolence at all, must in him be infinite bene-
volence, by reason of the infinite, that is to say, the inca-
"tably great, number of objects, upon which it is exercised.
But besides the evidences of divine goodness that are fur-


Hindooeflan, in the circum of Adoni; 15 miles N.N.E. of
Condore.

GOODS, in Mining, signify, in Derbyshire, the large
and massive lumps of lead ore, otherwise called bing or potter’s ore.

Goons, among public brewers, denote the malt or grains
and liquor in their matthum.

Goods, bona, in Law, and particularly the Civil Law,
include all kinds of effects, riches, lands, possessions, &c.
There are two kinds of goods; movables, res moventia, or
mellibius; and immovables, called res non moventia, or immo-

It is a maxim in the civil jurisprudence, that he who con-

-Goods, again, are divided into real and personal. (See
 Chattels and Estate.) And, lastly, into noble or free,
and servile or slave.

Goods belonging to the domain of the crown, ad jure
applicata, cannot be alienated for ever, unless it be done by
way of exchange; they may be sold under the faculty of
perpetual redemption.

Goods, Adventitious, adventitia, are those which arise ot-
other than by succession from father or mother, or from
direct ascendant to descendant. See ADVENTITIOUS.

Goods, Dotal, dotalia, those accruing from a dowry, and
which the husband is not allowed to alienate. See Dowry.

Goods, Fugitives. See FUGITIVE.

Goods, Paraphetamine. See Parapharmaceutical.

Goods, Prohibited. See PROHIBITED.

Goods, Proscriptions, procriptions, are those arising by direct
succession.

Goods, Receptual, were those which the wife might re-
serve the full property of to herself, and enjoy them inde-
dependently of her husband; so called, in distinction from
dotal and parapharmaceutical goods.

Goods, Vacant, vacantia, are those abandoned, or left
at large, either because the heir renounces them, or that
the distinct has no heir. See Bona.

Goods, Allotting of. See ALLOTTING.

Goods, Confinnement of. See CONFINEMENT.

Goods, Running of. See RUNNING.

GOODWIN, John, in Biography, a learned divine in the
fifteenth century, who is said to have made more noise
in the world than any other perfon of his age, rank,
and profession. He was born in 1593, and received his academical
education at Queen’s college, Cambridge; and, immediately
after he was admitted to orders, he was much admired for
the erudition and elegance which distinguished his pulpit com-
positions. In 1635 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 prominently, and to administer the sacrament
"to his whole parish. He embraced the Arminian 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 skilful 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 furious Republican, and, being eager in whatever he engaged, distinguished 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 abdique for a faction, and one of his pieces was burnt by the common hangman, and in the fame fire which executed its 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 assure 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 dissentient 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 Hill of Puritans, &c.

Goodwin, Thomas, who is styled by Anthony Wood "One of the Atlases and patriarchs of independency," was born in the year 1600 at Roleby 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 tutors, and to attract much notice in the university. In 1619 he was removed to Catherine Hall, of which he became a fellow. He soon showed 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 Chartist 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 disaffected with the terms of conformity, he relinquished his preferments, and quitted the university in the year 1634. In 1639 he was selected 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 fittings of the Long Parliament he returned to London and became pastor of a church there, and also a member of the assembly of divines. In his conduct in their various meetings, and his zealous support of the Presbyterians, contributed to render him a favourite with Cromwell, through whose influence he was, in 1649, 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 enthusiastically confident of the protector's recovery; and it is affirmed that when the event proved him mistaken, he exclaimed in a subsequent 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 considerate scholar, and a learned and eminent divine. In common register at Oxford he is described "in scriptis in re theologica qua plurimis Orbi notus." He was a high Calvinist, but while he zealously enforced 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 controversial pieces, sermons, expostulations, &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 Calvinists of the present day. Neal's Hill of Puritans, by Toulmin.

Goodwin, in Geography. See Goodwin Sand.

Gooings, in Sea Language, are clamps of iron bolted on the stern-post of a ship, whereon to hang the rudder and keep it steady; for which purpose there is a hole in each of them, to receive a corresponding spindle bolted on the back of the rudder, which turns thereby as upon hinges.

Goodgors, in Geography, inhabitants of the inland territory of the island of Sumatra, covered with long hair, and little superior to the orang outangs of Borneo. See Sumatra.

Gojindergur, a town of Hindoostan, in Sanore; 25 miles N. N.W. of Sanore.

Gool, a river of Hindoostan, which rises near Burraway, and runs into the Tapt, 8 miles S. of Chuprah.

Gool signifies a ditch or trench for water; called also a goit, gurt, leat, &c.

Gool, a breach in a sea-bank or wall; or a passageworn by the fluid and reflux of the sea. Vide 16 and 17 Car. II. cap. 11.

The word comes from the French, goulet, the gullet or neck.

Goolungee, in Geography, a town of Hindoostan, in the circar of Chandore; 25 miles E. of Chanderee.

Gooli, a small circar or province of Bengal, situated E. of Coos-Beyhar.

Goomah, a town of Bengal, 45 miles N. of Rampur. N. lat. 24° 23'; E. long. 85° 34'. - Also, a town of Hindoostan, in Bahar; 40 miles N. E. of Chittor.

Gombo, a town of Africa, in Bambara. N. lat. 15° 3'. W. long. 5° 10'.

Gombo, a town of Africa, in Kassan. N. lat. 14° 23'; W. long. 8 50'.

Gomong, a town of Hindoostan, in Derar; 12 miles S. of Nagpore.

Gomerpunk, a town of Hindoostan, in Oude; 16 miles S.W. of Azimgur.

Goopina, a town of Hindoostan, in Golconda; 20 miles N. E. of Culloor.

Goomepour, a town of Hindoostan, in Allahabad; 20 miles E. N. E. of Jompor.

Goomity, a river of Afa, which rises in the mountains.
GOO

GOOO, the island of Komonoon, and crossing the country of Oude, joins the Ganges, about 15 miles from Benares.

GONGAYAP, a small island in the East Indian sea, near the N.E. coast of Cumbhawa. S. lat. 8° 10'. E. long. 155° 24'.

GOONDHANAH, the ancient name of the province of Kajpur, which see.—Also, mountains of Hindustan, called "Konannah," situated in the E. part of the country of Malwa, extending from Huddinghah to Mundelly, about 150 miles long. N. lat. 22° 40', to 23° E. long. 75° 10'.

GOOPAMOW, a town of Hindustan, in Oude; 29 miles W. of Kairabad.

GOOPINGUNGE, a town of Hindostan; 32 miles W. of Benares.—Also, a town of Hindustan, in the bush of Agra. N. lat. 26° 24'. E. long. 79° 18'.

GOORACKPOOR, a province of Oude, bounded on the N. by the Tihbett, on the E. by Bittiah and Sarum, on the S. by Gazypour, and on the W. by the Oude proper and Bahratigh, about 60 miles long and 50 broad. The capital of the same name is situated 65 miles E. of Fyzabad.

GOOREH, the name of two towns of Hindustan; one in Oude and another in Allahabad.

GOORENTY, a town of Hindostan, in the circar of Chandos; 17 miles S.W. of Ganjam.

GOOS, a town of Nubia. N. lat. 18°. E. long. 34° 18'.

GOOSANDER, in Ornithology. See Mergus Mercator.

GOOSE, Anser, forms an order of birds in the Linnean system. (See Anseres.) 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 flusses 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 use of the farmer.

Goose, Ember. See Columba Inser.

Goose, Solan or Solax, sometimes called gaumet. The English name of a large water-fowl, called by authors Anser Baffanicus, and by Linnaeus Pelecanus Baffanicus, which see.

Goose Creek, in Geography, a river of New Jersey, which runs into the Atlantic, N. lat. 39° 53'. W. long. 74° 16'.—Also, a river of Kentucky, which runs into the Ohio, N. lat. 38° 10'. W. long. 86° 3'.—Also, a river of North Carolina, which runs into the Atlantic, N. lat. 34° 40'. W. long. 77° 21'.—Also, a river which falls into the Potomac, about a mile S.E. of Thorpe, in Fairfax County, Virginia.

Goose-dung, in Agriculture and Medicine. See Dung and Cinnepopulis.

Goose-foot, or Wild Oat, or Good Henry, in Botany. See Cnicopodum.

Goose-grass, or Wild Orchid, or Goose Grass, in Botany. See Cnicopodum.

Goose-grass, 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 Aperine.

Goose-grass, Great. See Asperugo.

Goose Island, in Geography, a small island in the gulf of St. Lawrence, near the coast of Labrador. N. lat. 50° 52'. Vol. XVI.

W. long. 59° 15'.—Also, a small island in Christmas Sound, on the coast of Terra del Fuego.

Goose Lake, a lake of North America. N. lat. 52° 55'. W. long. 94° 45'.—Also, a lake of North America. N. lat. 54° 30'. W. long. 101° 21'.

Goose-neck, in Sea Language, is a kind of iron hook fitted on 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 on the ship, so that it may be unhooked at pleasure.

Goose River, in Geography, a river of America, which runs into the Mississippi. N. lat. 43° 14'. W. long. 93° 56'.—Also, a river of South Carolina, which runs into Cooper's river. N. lat. 33° 2'. W. long. 79° 57'.

Goose-wing, in Sea Language, denote the claws or other corners of a ship's main-fall, or fore-fall, when the middle part is furled or tied up to the yard.

Goose-wing, at Sea, a certain manner of fitting a fall, which is thus performed: when a fall falls before a wind, or with a quarter-wind, and in a fresh gale, the foremen sometimes, to make the more halyards, unpar the mizen-yard, and then they launch out both fall and yard over the quarter on the lee-side, fitting guys at the farther end, to keep the yard steady with the boom, and this booms out the mizen-fleet. This they do to give the ship the more way, which otherwise, with these winds, the mizen-fall could not do; and this fall, so fitted, is called a goose-wing, and sometimes a fludding-fall.

Gooseberry Bush, Grosflabula, in Botany, is a species of the Ribes 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 best season for planting the cuttings is in autumn, just before the leaves begin to fall; observing always to take the handiornent 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 their plants as they put out, except those at the top, that 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 distant; and one foot under in the rows. They should remain here one year, and the crofs branches at times be cut off, as also the lower ones, so as to keep a clean item 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 have the fruit in its utmost perfection, should be set in an exposed place in rows of eight feet asunder, and each of the shrubs fix feet from the others in the rows. The best time for transplanting them is in October, when the leaves begin to decay.

Gooseberry, in Agriculture, is a plant that may sometimes be employed in the forming of hedge-fences, especially that found in the North by the name of Ironmonger.

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, in America, is a plant that may sometimes be employed in the forming of hedge-fences, especially that found in the North by the name of Ironmonger.

Gooseberry, in Cactus. See Cactus.

Gooseberry, in Malaysia. See Melastrum.

Gooseberry, in Natural History, the name given by author.
authors to a species of protruberances 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. Thee galls are greenish 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 paffes all its states in it. The gall, in all these cases, is found whole and unmarred; but if one is opened in which there is a hole pierced, this is sure to be found empty, that being the pantage by which the fly has made its way out. Reaum. Hill. Inf. vol. vi. p. 214.

Gooseberry Islands, in Geography, small islands near the E. coast of Newfoundland; 24 miles N.W. of Cape Bonavista.

Gooseberry Rocks, dangerous rocks lying on the coast of Effex county, in the state of Massachusetts.

GOOTA, a town of Hindooftan, in Gooondwaah; 10 miles S. of Nagpaur.

Gootoka, a town of Hindooftan, in the cirec of Ruttpunpaur; 5 miles S. of Ruttpunpaur.

Gooty, or Gotti, a town and fortrefs of Hindooftan, the capital of a diiftict in Mylore; 170 miles N. of Serinagapam. It is situated on a hill beyond the river Pen-mar, or Pen-auur, and towards Adoni; and was formerly the seat of government of a Maltratta prince; but at the death of Tippeo, the town and district were assigned 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 stratum at the surface; otherwise called the baffle, crop, out-going, or out-bur of that stratum; and each stratum is said to go out, buried-out, run-out, lead-out, want-cover, &c.

When the ore in a vein is suddenly ended in the leads or gages, it is said to go out; also when a stratum of coal's ends abruptly against a fault, or wall of gravel filling a fault, or baffle 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 masses which are sometimes met with in the strata accidentally, or without being continuous like all the regular strata, however thin.

Gopachitty, in Geography, a town of Hindooftan, in Coimbose; 18 miles N.W. of Errond.

Gopachun, a town of Bootan; 58 miles N. of Dinagepaur.

Gopaldroog, a forte of Mysore; 36 miles E. of Seringapatam.

Gopaulgunge, a town of Bengal. N. lat. 23° 2'. E. long. 89° 56'.

Gopaulnagur, a town of Bengal, 42 miles S. of Bardwan. N. lat. 22° 31'. E. long. 88°.

Gopeer, a town of Bengal; 15 miles E.E. of Ramgur.

Goperaillery, a town of Golconda; 20 miles E.S.E. of Hyderabad.

Gophina, Gopunthi, or Gapohn, in Ancient Geography, a town of Palestine, and chief place of one of the ten patriarchs of Judah. Eufebius places it fifteen miles from Jerusalem, towards Sichem.

Goplo, in Geography, a lake of Poland, in the palatinate of Brafzef, 16 miles long, and four wide.

Goppingen, a town of the kingdom of Wurttemberg, situated on the Vils, in a fertile country, having considerable woollen manufactures, and near it a medicinal spring; 20 miles N.N.W. of Ulm. N. lat. 48° 47'. E. long. 9° 41'.

Gor, a town of Peria, in the province of Fariflan; 57 miles N.N.W. of Schira. —Also, a town of Italy, in the department of the Meta; 8 miles S. of Brefcin.

Gor, a name given by some writers to a very lofty tree, which bears a fruit like the cfeufun; 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 bird of the 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 Gruse and Tetrao Lagopus.

Gora, in Geography, a town of Hindeoostan, in the cirec of Chandali; 20 miles W. of Saipour.

Goracally, a town of Bengal; 12 miles S.S.W. of Mahmulbour.

Goragot, a province of Bengal, bounded on the N. by Rungpour, on the E. by Radjoow, Patладah, and Isma-bad, on the S. by Bettoorish and Pargunnah, and on the W. by Dinagepaur; about 55 miles long, and from 12 to 50 broad. Its capital, Goragot, is distant 80 miles N.N.E. from Moorheadabad. N. lat. 25° 14'. E. long. 89° 22'.

Goral, a town of Poland, in Galicia.

Goram, a small islend, being one of the Moluccas, in the East Indian sea, S.E. of Ceram; reputed the most easterly boundary of Mahometanism. It has thirteen mountains. S. lat. 3° 42'. E. long. 121° 36'.

Goranto, a town of Asiatic Turkey, in Caramania; 80 miles S.W. of Sattah.

Gorapari, a town of Brazil, at the mouth of a river of the same name, which runs into the Atlantic. S. lat. 20° 40'.

Gorbara, a town of Coreica; 8 miles N.E. of Cabii.

Gorbata, a town of Africa, in Bikeludergeri, anciently "Orbita"; 12 miles S.W. of Gafia.

Gorbatov, a town of Rouflia, in the government of Nizoe Novogorod. N. lat. 56° 51'. E. long. 43° 14'.

Gorca. See Gorkah.

Gorce, or Gourte, denotes a weir. By lat. 25 Edw. III. cap. 4. it is ordained, that all gorges, mills, weirs, &c. leived or fet up, whereby the king's ships 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 gurge, a deep pit of water, and calls
GOR

it a gers, or gulf; but this seems to be a mistake, for in
Doomfiday it is called gour and gart, the old French word
for a twist.

GORCHWICH, in Geography, a town of Saxony, in
the Vogtland, 18 miles S.S.W. of Gera. N. lat. 50° 22'.
E. long. 11° 53'.

GORMUM, probably a corruption of Gorcum, a
town of Holland, situated on the river Linge, at its union
with the Waal. From the riecke of the principal church
may be seen 22 walled cities, besides a great number of
towns and villages; before the revolution it had one parish-
church, 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.

GORDIES, 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
1813, and the canton 4453 inhabitants, on a territory of
1674 kilometres, in 8 communes.

Gордеворр Point, a cape of Hindooftan, on the
coast of Rajamundry, at the mouth of the Godavery.
N. lat. 16° 42'. E. long. 82° 20'.

GORDIEUS MUS, in Ancient Geography, a mountain of
the Greater Armenia. Ptol.

GORDIAN I, Roman emperor, grandchild of the older
Gordian, was but thirteen years old when he was chosen
emperor, in connection with Maximus and Balbinus. He
was created Cæsar, 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
metropolis, people, and army united in giving him the enduring
appellation of their son. In the commencement of his reign he was governed by his mother's uncles, who abused his authority, and fet the honours and offices of the empire up to sale.
He was, however, happily rescued from this disgraceful condition by Mithusus, a man of learning, to whom he was also indebted for literary instruction and advice. In the year 241 he married the daughter of Mithusus; and raising his father-in-law to the post of praetorian prefect, committed to him the principal direction of public affairs. He proved himself worthy of the important trust confided in him, and discharged the duties of a triumvir 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 Euxine, for the purpose of repelling an invasion from Sapor king of Persia. Under his guidance, Gordian relieved Antioc, crossed the Euphrates, defeated Sapor, 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 ascribes them to the conduct, the experience, and wisdom of Mithusus, who shortly after died. During the whole expedition Mithusus had watched over the safety and discipline of the army, while he prevented their murmurs by maintaining a regular plenty 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 emperors expired with Mithusus; he was succeeded in the office of prefect by Philip, an Arab by birth, and consequently, says Gibbon, in the earlier part of his history, a robber by profession. He was a man of considerable military talents, but obsti-
lacious, 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 improve, an indul-
gent power. By his arts discontents were fomented among
the

N 2
the troops, which induced them to demand that his invincible
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 inclination;
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 leathers or harness of the chariot of Gor-
dian, king of Phrygia, and father of Mithras; so very
intricate, that there was no finding where it began or
ended.

The inhabitants had a tradition, that the oracle had de-
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 asunder with his sword; and thus,
lay Quintus Curtius, either accomplished the oracle, or
eluded it. But Arillobulus 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
thefatal 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 Juliodis.

GORDIUS, in Zoology, a genus of Vermes, the essen-
tial character of which consists in the body being round,
filiform, naked or smooth, and of equal thicknesses through-
out.

Linnæus, and after his example the French naturalists
Bruguier, 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 similarity is still more strongly evinced in the habits
of those species which occasionally penetrate into the flesh
of men and animals, and wherein for a while derive their
sustenance from the blood and other fluids. Notwithstanding
this analogy, under such circumstances we cannot but
agree with Linnæus that it is impossible to consider them as
internal vermes with propriety; since they only occasionally
reside in the bodies of animals as before mentioned, and in
their habits and manners of life at other periods differ more
effentially: they are literally aquatic animals, with carno-
vorous appetites; though for a certain length of time they
may subsist like the true intestinal vermes, when by any acci-
dental 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
meridana, or hair worm of the Indies, a pernicious creature,
referred to the genus Gordius by Linnæus in the latest edition
of his Syll. Nat., but from which it was afterwards removed
by his editor Gmelin to that of Filaria. This removal we
deem unnecessary, and under this prescription wish to restore
the species to its former situation in the genus Gordius.

Species.

MEDENAEIS. Body entirely pale. Linn. Sloane, Jam. &c.

This very remarkable creature is often from ten to twelve
or even fifteen feet in length, and in thickness not exceed-
ing a horse-hair. It is well known by its disfluous 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 en-
twists itself round the naked legs of the negro slaves, or
animals, and penetrating the skin, buries itself greedily in
the flesh, where it causes the most violent pains, accompanied
with troublesome itchings, and sometimes inflammation and
fever. The most certain means of extirpating 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
fail to a small flick by means of a piece of silk, the animal
may be gradually drawn out of the wound by turning the
flick round a little each day. The utmost circumcision is
required 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.

AQUATICUS. Pale brown, with blackish extremities.
Linn. Gordius feta, Müll. Vitulus aquaticus, Geln.
Moerovium, Jon. Chretin, Hill. &c.

This fo 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
also for its simplicity, confining merely, as it appears, of a
causal extending from one end to the other, and both the
mouth and vent over the most simple, without, since a small
vent communicates the first, 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 sum-
mer months, where it is frequently observed, and from its ap-
pearance is vulgarly imagined to be the offspring of horse-hair
dropped by accident into the water. It twists itself into
various contortions, and it is affirmed that its bite will oc-
casion the complaint called a whitlow. A fact still more ex-
tordinary, and which appears in some measure to be au-
thenticated with tolerable accuracy, is the retentive power of
animation, which this creature poiffesses in a very superior de-
gree, 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 moll latent spark of life must be extinct. If these latter
affirmations have not arisen from the result of some very
superficial experiments, they are at least to be received with
cautions, 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.

ARGILLACUS. Body uniformly yellowish. Linn.

Very much resembles the last, and like that species is
found in the clay at the bottom of stagnant waters.

FILUM. Body uniform and whitish. Müll.

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. Müll.

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.

ARNARIES. Pulious and obtuse. Müll.
Inhabitsthe bottom of Christians bay, in Norway.

GORDON, BERNARD, in *Biography*, a French physi-
cian of the thirteenth century, is said to have conferred
honour on the medical faculty of Montpellier, where he be-
gan to teach in the year 1275. As was the custom of
the time, he took his surname from the place of his birth, (Gor-
don in Rouergue) and called himself Bernardus de Gor-
donio, and not Gordonus, 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 Renchins 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. Eloy.
Dict. Hill.

Gordon, Mr., in the year 1744 played the first violin in
Drury-lane play-house. He was a young man, born in Nor-
folk, who had travelled to Italy for improvement. He was
very war-fightened, and always played in spectacles. He su-
ceeded Charke, had a strong hand, good tone, and was well
fitted to his situation. He generally played a concerto in
the second muse, as was then the practice, which was very
attractive. He was brother to the full title of the following
article.

Gordon, ——, an eminent performer on the vio-
loncello, 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 sub-frequent players in
the use of the bow, and knowledge of the finger-board.
He lived reputedly, had many powerful friends, and rea-
lised a competence by his profession.

In 1756, Mellers, Gordon, Vincent, and Crawford, under-
took the opera regency in the Haymarket. The two first
were experienced professors, and the third had been many
years treasurer under different managers. Gordon, an ex-
ceptional performer on the violoncello; and Vincent, a schoal
of the celebrated Martini, long a favourite on the lantbois.
His father was a bassoon player in the Guards, and his bro-
ther, James Vincent, who died young, was joint organist of
the Temple with Stanley, and a brilliant performer. Mr.
T. Vincent, the impresario, had 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 com-
mand, though of so forward a family as an opera, vocal, and
instrumental band, turned his head and his purse inside out;
in short, he soon became a bankrupt, feuded in indigence
during the rest of his life; and his colleagues, though they
escaped utter ruin, were not enriched by the connivance.

Gordon, Alexander, a learned writer of the eighteenth
century, was a native of Scotland. He was well acquaint-
ed with the Greek and Latin languages, and being a good
draughtsmen, he was enabled to derive peculiar advantages
from a long residence in Italy, and from his travels in other
parts of Europe. He was engaged as secretary to the so-
ciety for the encouragement of learning; and to the Egy-
pitian 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 jour-
ney 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 Caroli Leprena."
"A
complete History of ancient Amphitheatres, translated from
the Italian."
"An Essay towards explaining the hiero-
lyphical Figures on the Coffin of a Mummy."
"Twenty-five
Plates of all the Egyptian Mummies in England, and other
Egyptian Antiquities."

Gordon, Andrew, was born in 1712 near Aberdeen.
He was sent to Ratibon, where he applied himself to poeti-
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 at-
tended 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 sub-
ject was entitled "Phenomena Electricitatis Expound,"
1743; and in the following year he published in 3 vols.
Svo. "Philosophia utilis et jucunda." He was author of an
"Impartial Account of the Origin of the present War in
Great Britain," and of "Physica Experimentalis Ele-
ments."

Gordon, James, a Scotch Jesuit, was born in the year
1743. He left his native country, and went to Rome,
where he entered the society of Jesus, in 1753. He became
distinguished for deep and extensive learning, and was sent
on religious missions into Germany, Denmark, and the Bri-
tish isles, where he is said to have founded much on account
of his attachment to the Catholic faith. He died at Paris
in 1762, leaving behind him a work in two volumes Svo.
titled "Controversiarum Christianae Fidei 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 vol-
umes folio, under the title of "Biblia sacra, cum Commen-
taria ad fumum Literae, et explications Temporum, Locali-
rum, Rerumque omnium, quae in sacris Codicibus habent ob-
seuratam: una cum Textu Biblico." This work is well
spoken of by Dupin. He was author likewise of a work on
Chronology: and of "A System of moral Theology." &c.
Roreri.

Gordon, Thomas, a native of Kirkcudbright, in Scot-
land, after having received an academical education in his
own country, came to London, and maintained himself by
teaching the learned languages. His talents were made
known to people of confection, and he was employed by
the earl of Oxford in queen Anne's reign as a political
writer. He wrote in defence of bishop Bradshile in the
Bangan controversy, and became the agent and partner of
Mr. Trenchard, in his literary undertakings. They pub-
lished, in conjunction, a series of papers, entitled "Cato's
Letters;" and the "Independent Whig," which M. Gor-
don 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 measures, and pre-
cured 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. To these trans-
lations he prefixed discourses relative to subjects of each or-
iginal author. He died in 1759, at the age of sixty-five.
Some of his posthumous tracts appeared in two works,
titled "A Cordial for Low Spirits," and "The Pillars of
Priestcraft and Orthodoxy shaken." He was a distinguished
writer in favour of civil and religious liberty, and is highly
esteemed.
GOR

eoine by the friends of freedom for the manly spirit with which he supported its cause against tyranny of every kind.

Gen. Bract.

GORDONA, in Geography, a town of Naples, in the county of Milef; six miles S.W. of Milef.


Gen. Ch. Cal. Persian, simple, inferior, of five roundish, concave leaves. Gor. Petals five, large, obsolete, or obcordate, concave, cobering at their base, somewhat unequal. Stam. Filaments very numerous, thread-shaped, united at their base into a thick cup-shaped body; authors oval, erect. Pet. German superior, ovate or nearly globose; style short, columnar, obtusely five-fused, sometimes five-cleft; stigma five, acute, horizontal; Peric. Capsule ovato or globular, of five cells and five valves, the partitions from the middle of the valves, which are deeply cleft at their base. Seed in two rows in each cell, angular, winged, inserted into a five-clefted angular column.


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 scattered, on short flalks, elliptic-lanceolate, three to five inches long, bluish, with numerous shallow furrows, veiny, smooth on both sides, of a thin shining green, like those of Prunus Laurocerasus above, paler beneath. Stipulas none. Flowers solitary or simple axillary flalks, thrice as long as the footflalks, as large as a moderate rose, white with yellow stamens, very handome but indorosum. A pair of deciduous fringed bracteas, 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 flalks cohering imperfectly and irregularly together in parcels, besides being connected by one common flaky base. If this base be called a notary, for which there is no good reason, then the flower is polydelphous, but we think, with Dr. Sims, and most others, that it is monodelphous.

2. G. Hematophyllum. Swartz. Ind. Oct. 1199.—Blood-red Wood Tree.—Flower-flalks very short. Leaves elliptic-lanceolate, pointed, serrated, smooth. Petals inveredly heart-shaped. Style deeply five-cleft.—Native of dry woody places on lofty mountains, in the west side of Jamaica; Dr. Swartz, from whom we have specimens. A tree, whose stem is from twelve to sixteen feet high, with a smooth greyish bark, and round slender straight compound leafy branches, Leaves two or three inches long, foliiferous, elliptic-lanceolate, tapering at both ends, with a blintith recurved point, smooth on both sides, little 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 flalks, not so long as the footflalks, bearing one or two unequal brackeas; their petals pale flesh-coloured, unequal, deeply lobed, feecly so large as those of G. Lafianthus, but flatter and more spreading. Germes silky, ferrowed. Style, according to Dr. Swartz, divided into five. Capsule oblong, rather pointed. Seeds two in each cell, with an abrupt wing.—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 furniture, but as yet no known, or not distinguished, by European workmen. The peculiar structure of the style does not constitute any generic distinction here, any more than in the neighbouring genus Stauraitis. See Sm. Exot. Bot. v. 2. 101.

3. G. pubescens. L'Herit. Stirp. Nov. 156. Cavan. Diff. t. 162. Vent. Jard. de la Malmaison, t. 1. —Flowers nearly sessile. Leaves downy beneath. Capsule globose.—Native of South Carolina, now not uncommon in green-houses, flowering in August. A handsome fern, whole branches, calyx, and the backs of its leaves, are clothed with fine white pubescent down. The flowers most a flable to the fruit in the first, but it is not a herbaceous plant that can anywhere 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 sides of the leaves look alike.

4. G. Franklinii. L'Herit. Stirp. Nov. 156. (Franklinia Alatamaha; Marshall. Arb. 49.)—Flowers sessile. Leaves smooth. Capsule globose.—Native of South Carolina. Flowers sessile, 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 a dried specimen. The capsule, according to L'Heritier, is "globose and umbilicated. Seeds numerous in each cell, imbricated in two rows, slightly angular, much like those of the Cypres, the angles somewhat bordered. Leaves alternate, on short foot-flalks, oblong, toothed, attenuated at the base, and smooth."—Marshall and Bartram say the flowers smell like a china orange, and are often five inches in diameter, the lower petal hollow, enfising the roll till they expand, as in G. pubescens. It was first observed by Mr. John Bartram in 1760, on the borders of the Alatamaha river, in Georgia.

GORDYGONG, in Geography, a town of Hindooflan, in Vifapur ; 22 miles N.E. of Poonnah.

GORE, in Heraldry, deserves one of the regular abate- ment. It is used, according to Guillim, to denote a coward. It consists of two seven-rays on both sides, drawn from the outer chief, the other from the outer bow, and meeting in an acute angle in the middle of the sable point.

GOREE, or GOFRE, in Geography, an island in the German ocean, near the mouth of the Mask to 15 miles in circuit; two miles N. of Schouwen. Nat. lat. 51° 49°

E. long.
GOR

E. long. 3° 50'.—Algo, a sea-port town of this island, near
the E. coast, on a canal communicating with the Meuf; for-
merly carrying on a considerable trade, but the harbour
is now choked with sand ; 6 miles W. of Helvoëtsluys.

GORE, a small island in the Atlantic, within camou-
flage of the coast of Africa, about two miles in circum-
ference. 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 his perceiving the fertility of the soil, the springs of fresh water
have been discovered, and a variety of vegetables and fruit trees have
been planted; so that the island, once barren and despicable,
now makes the most fertile, pleasant, and important settle-
ings in Africa. Gore was ceded to the Dutch in 1617
by a king of Cape Verd, 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 Nafjau; but
here, incapable of defending themselves, they were obliged
to surrender at discretion. Upon the arrival of M. du
Caffes, 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 possessed the
island. The conquest was secured to the company by the
league of Nimeguen. The French immediately repaired
the forts, and changed their names, calling the lower fort
"Vermandaine," and the higher "St. Michael." In 1759
Gore was taken by the English. By the treaty of 1753
Gore and its dependencies were left to the French. In
1778 it was taken by the English. N. lat. 14° 40'. W. long.
17° 30'.

GOREG, a small island on the coast of Brazil, at the
mouth of the Rio dos Reyes Mago. S. lat. 10° 10'.

GOREING, or Goreg, is said of a fall when cut flan-
ing, so that it is broader at the close than at the earing, as
all top-fails and top-gallant-fails are.

GOREL, a name or title given to the prince of Georgia.
The gorel is always a Mahometan. The sphyra of Persia
obliges him to observe the religion of the Alcoran, in order
to preserve the dignity of gorel in his family.

GORE's BAY, in Geography, a bay on the S.W. coast
of the island of Tavai-Pennamooz. S. lat. 43° 12'. W. long.
186° 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 islands; it is about 50 miles long from N.W. to
S.E.; and it appeared barren and uninhabited. Some sea-
otters were seen. N. lat. 60° 40'. W. long. 172° 30'.

GORESBRIDGE, a small port town of the county of
Kilkenny, Ireland; 51 miles S.W. from Dublin, on the road
to Waterford.

GOREY, a port town of the county of Wexford, Ireland,
also called Newborough, which, before the Union, was re-
membered in parliament. It is 45½ miles S. from Dublin, and
21 N. from Wexford.

GOREY-MOUNTAINS of Ireland, in the county of Donegal,
near Raphoe.

GORGES, a town of Mingrelia, on the Black sea; 50
miles S. of Anargria.—Algo, a river of Naples, which
runs into the Liban, in Calabria Citera.

GORGE, in Falconry, is the uppermost bag or stomach
of a hawk or falcon, being that which receives the food the
bird.

The gorge, ingluvies, is the same, in birds of prey, with
what we call the crop or crop. When the bird is fed, it is
said to be gorged.

GORGE, in Architecture, denotes a sort of concave mod-
elling, wider but not so deep as a festoon; used chiefly in stanes,
chimneys, &c.

Gorge of a Chimney, is that part between the chambranle
and the crowning of the mantle. Of this there are divers
forms; straight, perpendicular, in form of a half, &c.

Gor od sometimes also used for a moulding that is con-
cave in the upper part, and convex at bottom; more pro-
perly called guila and cymatium.

Gorge is also used for the neck of a column; more pro-
perly called colonum and gorrerin.

Gorong, 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.

Gorong of a Half moon, or Ravelin, is the space between
the two ends of their faces next the place.

Gorge of the other outworks is the interval between their
sides next the ditch.

All the gorges are to be made sufficient of parapets;
otherwise the besiegers, having taken possession of a work,
might make use thereof to defend themselves from the foot
of the place: so that they are only fortified with palisades,
to prevent a surprise.

GORON, Half the Gorge, demi-gorge, that part of the poly-
gon between the flank 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.

Gorong 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.

Gorong, among Fortresses, &c., signifies as much as swell-
d. In which sense they say, "the legs of an horse are
gorged;" the pattern joint is gorged; you must work him out,
to disgorge his shoulder.

Gorong, in Rural Economy, a term which is sometimes
applied to signify being laden by fresh luxuriant green food,
and relates to cattle, &c.

GORGEM, a part of the ancient armour, being that
which covered the throat or neck of a person armed at all
points.

GORGEM, or Gorge, in Architecture, the little freeze in
the Doric capital, between the astragal, at the top of the
shaft of the column, and the annulet.

Some call it collars. Vitruvius gives it the name hypa-
trachelion.

GORGE, in Military Affairs, a piece of brass or filter,
borne by the officers of foot on their breasts when on duty.
The gorge hanges round the neck by a riband; they are
sometimes gilted, and have commonly some device engraved
on them, as the sovereign's, or even the colonel's coat of
arms, crest, or cypher.

Gorong, an instrument used in Surgery, for the purpose
of cutting an opening into the bladder, so as to enable the
operator to introduce the pair of forceps and extract the
stone.
GOR

It is impossible to give the reader a proper notion of the form and manner of using the gorget, 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, contrived 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. Ayley Cooper uses, instead of a gorget, a common scalpel with a beak, which glides along the groove of the staff into the bladder. Several other knives and instruments 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.

GORGIA, surnamed Leontius, in Biography, 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 shewed the use of them for the invention of arguments. Hence Plato gave the name of Gorgias to his elegant dialogue on this subject, which is still extant. He was so great an orator, that in public assemblies he would undertake to declaim extempore upon any subject proposed to him. In the war between Syracuse and Leontium, the citizens of the latter applied to the Athenians for succour, and employed Gorgias and Thras as their ambassadors, the former of whom was peculiarly qualified to influence popular assemblies by his bold and persuasive eloquence. On their arrival at Athens about the year 427 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 statue was erected to his honour at Delphi. He is said to have lived to the great age of 107 or 108.

GORGONIA, in Geography, a town of Naples, in the Basilliaca; 15 miles E. of Venusia.

GORGONIA, an island of small extent and of a circular form, in the Mediterranean, about 16 miles from the coast of Etruria. The mountains, say Sommii, 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'.—Alto, 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. 77° 52'.


GORGONIA, in Zoology, a genus of Zoophytes, the stem of which is coraceous, woody, corky, horny, or somewhat bony, and in general flexible; the texture glaffy, fibrous, or like bone, frilled, tapering, fixed at the base, which is dilated, and covered with valvular or cellular flesh, or bark of a spongy and friable nature in a dried state; the mouths or cells covering the surface of the stem and bearing polypies.

These marine productions were regarded by the ancients as a class of plants, and described as such by their hotanists; nor was this idea, however remote from truth, exploded till fo late a period as the eighteenth century, when the discoveries of Peyssonel upon the nature of coral, published in 1772, and those of Trembley on the hydras (or polyps) about fourteen years after, contributed to demonstrate, in a very explicit manner, that the gorgonia 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 professor Pallus, or our own countryman Ellis, and his friend Dr. Solander; nor indeed can we hesitate to confess, that our knowledge of the gorgonia tribe has been enlarged only in a very inconsiderable degree by any of the fabricant authors on this subject. The latest observations tend principally to confirm the accuracy of those writers who had before affurred us the gorgonia are the habitations of various kinds of polyziferous animals, each of which resides in a distinct cell; that they lie in general dormant or contracted during winter, and, like the blossoms of plants, push forth buds, and expand in their proper season, which is constantly in summer. The stem and branches of the gorgonia, which are most commonly of a somewhat horny and flexible nature, may be confidered as the true skeleton of the cells of habitations, being covered with a fleathy or pulpous fulfulness, 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 stricture of these, in addition to the general aspect of the plant-like neat 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, the secondary or least important character. It may be lusily observed, that the gorgonia 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, no 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 corallike 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.


Native of the Norway seas, from eighteen inches to two feet high; flesh pale, with whitish skin or scales; stem white, with a brown bark and cartilaginous branches.

VERTICILLARIS. Ramose, ramose, with alternate parallel subdivisions, covered with verticillated incurved florets. Müll Pallas, &c. Sea-earther, Ellis.

From two to three feet high; stem brittle and white, with flexible branches. Native of the Mediterranean and North seas.
GORGONIA.

Placomen. Branching both ways, with flexuous, and rarely uniting or anastomosing branches, covered with conic florets. Linn. Warted-fan, Ellis. Lithosyphon, &c. Brey. Height two feet; item ereth, woody, and yellow, scarlet or reddish cinnereous. 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; item brown; branches long and slender. Succinea. Round, amber-colour, dichotomous, rigid, the item covered with tubercular gaping florets. Pallas. A very rare species, the native place of which is unknown; it is only six inches high, the item teltaceous. Americana. Branched and sub-divided, the sub-divisions nearly opposite, compressed, with rows of polysperous cells on each margin; flesh yellowish, within pale purple; bone hornly. Gmel. Gorgonia pinnata, Soland. and Ellis. Native of the West Indies; flesh purplish or yellowish. Exserta. Round, with a few alternate branches; florets alternate, eight-valved; flesh covered with minute white scales; bone brownish, hornly. Soland. Height two feet; branches long, slender, and white; polypes with eight feelers and exerted. Inhabits the West Indies. Patula. Compressed, with flexuous sub-pinnate branches, crinmon, with two rows of florets each side, each surrounded with a whitish ring; bone brownish, hornly. Soland. Native of the Mediterranean. Ceratophyta. Branched, with divaricate erect sub-divisions, each marked with two furrows; florets white, in irregular rows; flesh purple; bone black and hornly. Gorgonia ceratophyta, Soland. Corallina fruticosa purpurea, C. B. H. Lithophyton, &c. Gecn. Corallina fruticosa erecta, Catenby. 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, hornly; flesh orange-colour, with two furrows; florets longish. Soland. &c. Junca lapidei, Phin. Palmjuneae albus, Rumpf. 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 hornly; 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 molten abundance near the Cape of Good Hope. Unbractrum. Fan-shaped, and somewhat reticulated; branches numerous, divergent and round; flesh reddish, warted or covered with florets. Soland. and Ellis. Native of the Indian sea; item 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 divaricated slender branches; flesh violet and sub-veruculous. Pallas. Round, smooth and blackish, with the extremities of the branches yellow. A South American species.

Sasappo. Sub-dichotomous, round, with divaricated slender branches; flesh red, with numerous hairy florets. Pallas. Aescularis sasappo, virga fangium, Rumpf. About twelve inches in length, the texture hornly, and colour black. The bennace is frequently observed adhering to this species. Palma. Flat, with numerous very long and simple divisions; flesh smooth, sprinkled with simple pores. Pallas. Chamerophyla perigrina, Claffus. Grows to the height of six feet, though more commonly not exceeding two or three feet; the substance hornly, covered with a calcareous coating, and flexible. Inhabits the Indian ocean. Radicata. Very much branched, and corycx; with minute scattered pores, and many-feet 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 sub-fililated scattered pores. Pallas. Height three feet; flesh red, spongy; bone pale red and corycx; branches long, round and erect. Found in the Indian and African seas. Coralloides. Woody, ereth, sub-dichotomous, and variably formed; flesh tuberosus, with filulated tuberculated florets. Pallas. Corallina lignum incrustans, Bosc. Native of the Mediterranean; length one foot, very tough, pale grey, with yellow florets. Elongata. Dichotomous, divaricated, with the flesh red, and covered with papillosus scattered sub-imbricated pores. Gmel. &c. Pale and brittle, with square branches with pores at the angles; grows to the height of four feet, and inhabits the Atlantic. Scirpea. Very simple, straw color, with a decomposite leafy base, and felt tuberculated flesh. Pallas. Fuscous, tapering towards the tip; the flesh cinnereous when dry; inhabits the Indian seas. Setaceae. Simple, rigid, with calcareous white sub-tuberculated flesh. Pallas. Iclis plecanum. 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. Iclis placentum. &c. Mercat. Height eight inches; branches long and slender; bone blackish and hornly; florets white; the polype furnished with eight feelers or claws. Native of the Atlantic and Mediterranean. Muricata. Round, with depressed sub-divided branches; flesh thick; pores cylindrical and spinous. Pallas, Ellis, &c. Epiceratium, &c. Petiv. Lithophyton, Tourret. Native of the American islands; height from two to three feet; coriaceous, hornly, with a whitish medullary nerve. Verrucosa. Bifarious, with round, sub-dichotomous flexuous branches; flesh calcareous, pores whitish and prominent. Pallas, Ellis, &c. Lithophyton marinus, Gecn. Corallina alba marina, C. B. H. Frutus marinus flabelliformis, &c. Ray. Frutus marina, &c. Petiv. 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 shops.

**Nobilis.** Dichotomous, the branches somewhat tapering; flesh red, flabby, and felt; the surface speckled with numerous eight-angled, conic, and rather elevated, irregularly disposed pores; bone bright red, frutted, and slightly punctured externally. Soland, and Ellis, &c. *Plagophyllum,* Linn. Nat. XII. *Medieus maris,* Linn. Nat. Nat. X. *Ipsi Pallas.* Corallium sagrum, Donn. 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 seas about Madeiras, Corse, Sicily, and the coast of Africa, in the vicinity of Barbary, the coral fisheries in these parts being carried on with great spirit, and proving highly lucrative. From the observations of Donini, an author who has devoted much attention to this curious subject of enquiry, we understand that the flesh or exterior coating 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 or coral itself. The most prevalent colour of the bone is red, exhibiting all the transitions from a pale rose colour to fine scarlet; and sometimes inclining to yellowish or fine saffron. The coral grows in a shrubby form, and not unfrequently 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 frutted, 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 the material qualities; in addition to its beautiful texture or grain, and colour, have contributed to render it valuable in the estimation 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 votaries at present than formerly. The polypes, 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 polypes are likewise white.


Inhabits the American, and some of the European seas; height nearly two feet; bone roundish, tapering to the ends, and violet when recent.

**Crassa.** 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 sagita,* Theophr. *Lithoscylen, Brow.

Grows to the height of 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 flavum pallidum, Tournef.

Native of the Atlantic and Mediterranean seas; height one foot.

**Violacea.** Rather depressed, with pinnated branches; flesh violet; nearly square, with somewhat prominent pores. Pallas. *Quercus marina, Theophr.

Inhabits the American seas, above a foot long, and horry.

**Setosa.** Round and pinnated, with diffuse branches; flesh purplish. *Antipathis hirsutum, Bon. Lithophyton, Tournef.

Grows to the height of two feet; very upright, and inhabits the Mediterranean and American seas.

**Petechizans.** Sub-dichotomous, very much branched, with a yellow hirsute flesh covered with red pores. Pallas. Gmel. &c.

Native place unknown; bone hornv, black, with amber-coloured ramifications.

**Pectinata.** Round, with parallel ascending 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.

**Austera.** Ramose pinnated; flesh yellow, with rows of purple florets each side; bone horny and yellowish. Soland, and Ellis.

Native of the African shores, and seldom exceeds a foot in height.

**Calycifera.** Dichotomous and subdivided, with erect thick ramifications covered with truncated papillae; flesh cinereous, within purplish; cells large and cup-shaped; bone dark brown and horry. Ellis.

Inhabits the American seas.

**Briareus.** Subramose, round, thick; flesh pale or whitish within, externally cinereous; bone composed of small purple glairy 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 and round ramifications, and red tuberculated bark.

Very ponderous, of a grey colour, and inhabits the Indian ocean.

**Clathratus.** Reticulated, wobby; 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, horry, and slightly frutated on the larger branches.

Found adhering to various substanccs, and varying in colour
colour from yellow to purple: this species inhabits most
feas.

GORGONIUM, in Botany, a name given by some authors to the common crypgium or crynugo, the roots of which we use candidly.

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 Stheno, Euryale, and Medusa, the daughters of Phorcus by Ceto; the latter of whom was mortal; and having been delivered by Neptune, was killed by Perseus; the two former were subjected neither to age nor death. They are described with wings on their shoulders, with serpent round their heads, whose heads were of brazen, and their teeth of a prodigious size; so that they were objects of terror to mankind. Echyleus, in his Pindar, 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 Echyleus, and heightens the fable by these circumstances, unknown to his predecessors. The first is, that the Gorgons turned those into serpents whom they looked upon, and that it was by this kind of death that Perseus, in preparing Medusa's head, destroyed the island of Seriphus, whose inhabitants he perpetrated, together with their king. The second is, that Minerva, who aided Perseus while he was struggling with Medusa, being surprised with the melody of the Gorgons' sighs, intermingled with the hislings of their serpents, felt certain charms on that mixed composition of dolorous 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 Pegasus, whom Hesiod represents as having taken flight to the mansion of the gods, was afterwards broken by Minerva, and given to Bellerophon, who mounted him to combat the Chimæra; but that he having attempted to ascend to heaven on the wings of that horse, was thrown down to the earth, and Pegasus placed among the stars. (Pindar's OI. III. Pyth. VII.) The Latin poets, though faithful copiers of the Greek ones, have yet loaded the fable of the Gorgons with new circumstances. Homer had said, that the Gorgon's head was engraved upon the tremendous Eglys of Minerva; Virgil adds, and upon her cuirsia too, in the place which covered the goddess's breast:

"— Ipsanque in pelfore Divi
Gorgonae deicta vertem lumina colla." Æn. I. viii.

After the death of Medusa, her sisters, according to Virgil, were appointed to keep the gate of the palace of Pluto:

"Multae praeter caue variauis monitra ferarum —
Gorgones, Harpapheae——" Æn. I. 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, I. iv. and v.

Diodorus Siculus will have the Gorgons and Amazons 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.

Paulusinus says, the Gorgons were the daughters of Phorcus, probably by mistake for Phorcus; after whose death, Medusa his daughter reigned over the people dwelling near the lake Tritonis. The queen was passionately 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 so 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 astonishment.

Others represent them as a kind of wonderful women, covered with hair, who lived in woods and forests. Others, again, make them animals, refreshing wild sheep, whose eyes had a poisonous and fatal influence.

Xenophon of Lampactus, who is followed by Pliny and Solinus, was of opinion, that the Gorgons were female faeries, who inhabited the islands Gorgades. Hanno, the Carthaginian general, penetrated as far as those islands, where he found women, who, in swindles, turned the flight of birds. Gerard Vossius, in his "Origin and Progress of Idolatry," is persuaded, that the fable of the Gorgons took its rise from the relation of Hanno the Carthaginian general, above cited, from Xenophon of Lampactus. Le Clerc, on the contrary, in his notes upon Hesiod, takes them for the mares of Libya, which the Phœnicians in a voyage to Africa had taken away. Banier (Mythol. vol. iii.) is of opinion, that the Gorgons dwelt in that part of Libya, which was afterwards called Cyrenaicum; and that Phorcys, their father, had conquered Ithaca, which was not far from the coast of Africa, where he resided. 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, sailed from the isle of Seriphus for the coast of Libya, 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 Euryale. They were loaded with the teeth of elephants, the horns of stags, and the eyes of hyenas, which Phorcys bartered for other goods. This, it is said, is the mystery of the tooth, horn, and eye, which the Gorgons bartered by turns; that is, the ships, when arrived in the port, took each of them goods proper for the place where they were bound. The other fiction, that accompanies this history, says the author now cited, will explain themselves.

For a farther account of them, see Mem. Acad. Inscript. vol. iv. p. 72. seq. See Musaena caput.

GORGONZUOLO, in Geography, a town of Italy, in the department of the Oltro; 10 miles N.E. of Milan.

GORGORA, an isle of Abyfes, in the lake Dombes (which see), where a palace was built, which is the usual residence of the emperor in winter.

GORHAM, a post 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 1764, and containing 2053 inhabitants.


GORITZ, or Gonn, in Geography, a country of Germany, in the circle of Augsburg; bounded to the N.E. and S. by the duchy of Carinthia, and on the W. by the Venetian states. The chief produce of the country consists in wine and fruit, with some corn and silk; the horses and oxen are
few, but the goats are numerous. The language of the country is Scavonian, and the religion Roman Catholic.

Goritz, or Goritz, 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 Lisono. Besides the church, since the year 1784, not metropolitain, it has seven convents, nine chapels, and a college. In 1797 it was taken by the French: 20 miles N.N.W. of Trier. N. lat. 46° 5'. E. long. 13° 33'.

Goritz, a town of Brandenburg in the New Mark, seated on the Oder, formerly the metropolis of the circle of Lobs.

Gorka, a town of Hindostan, in Mewat; 12 miles S.S.W. of Cottibah.

Gorkah, a town of Afn, situated in the N.E. part of the small state so called, on the borders of Napaul; 35 miles N.W. of Catmandu. N. lat. 28° 25'. E. long. 84° 36'. The country lies between the provinces of Oude and Thibet, and is governed by a raja dependent of Thibet.—Alto, a town of the duchy of Warsaw; 40 miles S. of Posen.

Gorleus, Abraham, in Biography, a celebrated medallist, was born at Antwerp in 1549. He devoted himself entirely to the collection of ancient medals, seals, rings, and other curiosities. He died at Delft, where he spent his greatest part of his life, in the year 1609. His works are entitled "Dactylythone Teum Annumorum Sigillorumque e Ferro, Aut Argento, atque Auro Promptuarium"; "Theaurorum Numismatum familium Roman." "Paralipomena Numismatum." His works are highly valued by those who are addicted to these studies. Moreri.

Gorlitz, in Geography, a town of Upper Lusatia, seated on the river Neisse, and the first town in the country with regard to fire, 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° 32'.

Gorochovetz, a town of Russia, in the government of Vladimir; 32 miles E. of Vladimir. N. lat. 56° 10'. E. long. 42° 32'.

Goroditsch, a town of Russia, in the government of Penza; 32 miles S.E. of Penza. N. lat. 53° 20'. E. long. 45° 30'.—Alto, a town in the government of Kiev, 312 miles S.E. of Kiev. N. lat. 49° 3'. E. long. 32° 54'.—Alto, a town in the government of Tobolsk, 20 miles E.S.E. of Enieffik.

Gorodnia, a town of Russia, in the government of Tver, on the Volga, 23 miles E. of Tver.

Gorodntsew, a town of Russia, in the government of Tchernigof, on the Snov; 32 miles 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'.

Gorod, 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 1800, and the canton 12,723 inhabitants, on a territory of 200 kilometres, in 11 communes.

Gorce, a small island in the East Indian sea; 20 miles S. of Gollbi. S. lat. 1° 8'. E. long. 128° 33'.

Gornouale, or Gorontano, a town on the E. coast of the island of Celebes.

Gorreta, a town of Hindostan, in Berar; 24 miles W. of Chandon.

Gorris, John, in Biography, was born at Paris in the year 1535. 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 polished both the learning and pedantry requisite to form an accomplished physician, and to have practised 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 Gorris was stopped by a party of soldiers, when on his journey to Melun 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 Gorris, was a physician at Bourges, attained considerable eminence, and left two works, one on the general "practise of medicine," dated 1555; the other, a "collection of formularies," 1562, both in Latin. Eloy Diet. Hill.

Gorriti, in Geography, a small island in the river La Plata.

Gorsa, a small island near the S. coast of Cuba. N. lat. 21° 45'. W. long. 81° 25'.

Gorse. See Purze and Ulex.

Gorsiho, in Geography, a town of Sweden, in Helsingland; 30 miles W. of Hudikswall.

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 Kilmacough, the site of a bishop. Gort is 68 miles W. from Dublin.

Gorter, John, in Biography, a physician, who, after having been a disciple of the celebrated Boerhaave, became a distinguished teacher of medicine at Harderwick, his native place; in consequence of which he was elected a member of the academies of Petersburg, Rome, and Haerlen, and obtained the title of physician to Elizabeth, 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 74.—His works, the titles of which are enumerated by Eloy, relate to physiological and practical subjects, as well as to the practice of the ancients. Eloy. Diet. Hill.


Gen. Ch. Common calyx of one leaf, inbricated with spinous flakes, the innermost gradually longer, straight, bristle-shaped, rigid. Cor. compound, radiated. Florets of the common species, pericarp, with a funnel-shaped five-lobed corolla; that of the radius fewer, female, with a flagellum lanceolate one. Stam. (in the perfect florets only) Filaments five, short; anthers united into a cylindrical tube. Piff. (of the perfect florets) German hairy; style thread-shaped, the length of its own little corolla; stigma cloven. In the female florets the german is obsolete and abortive; style none; stigma none. Petio. none, except the calyx, falling off.

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; *pennisetum*, *jacq.*. *Plantarum* v. 4. t. 21. f. 1; *rigens*, Curt. Mag. t. 92; *squarrosa*, *ciliata*, and *fruticosa*. The latter is the same plant as *G. affinis*, Linn. Suppl. 381, but different from *Atriplex hoffmanniana*, under which it is quoted in Syll. Veg. ed. 14. 730.

The genus thus understood undoubtedly forms a very unnatural arrangement, Linnaeus having chiefly considered the simple-leaved calyx, as Gortyn long ago remarked. Willd.-now accordingly has but seven *Gorteria*, *pennisetum*, *rigens*, and *ciliata* of Linnaeus, with *diffusa*, *gracilis*, *pelatina*, and *helia* of Thouars. Others are feit to his genera of *Myrtus*, whose receptacle is villous, and feed-down formed of simple hairs; and *Berkheya*, whose receptacle and feed-down are chaffy. Among the latter are the beautiful and truly wonderful *G. ciliata*, and the *spinosus*; the latter figured in Jacq. Hort. Schonbr. t. 372. This doubtleas a great improvement, but it seems to us that the genus mull, after all, chiefly depend on *G. pennisetum*, which is an annual plant, of no beauty, with many spreading *flos*, about a foot high. Leaves alternate, spatulate, revolute, pinnatifid or undivided; very white and cottony beneath, and green and brightly, like the *flos*, above. Flowers solitary, terminal, small, yellow, with numerous prominent spines to the calyx. The *flos* are crowned with wool, but have no proper *pappus* or seed-down. The leaves of *G. rigens* bear some analogy with this, but the large orange blossoms, unarmed calyx, and long simple seed-down, urge the propriety of separating it. The latter is Lamarr’s *Gaertneria*, above quoted.

**GORTYNA**, or GORTYN, in Ancient Geography, an inland city of Crete, being, according to Strabo, near 90 furlongs distant from the city of Phaestus, or that part of the Mediterranean which lay the southern part of the island. Its origin is obscure, some ascribing it to Gortyn, the son of Rhamanidus, 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 Menelas there sacrificed to Jupiter 100 oxen, when he received information of Helena’s flight. Its walls were walled by the river Lethia. Theophrastus, Varro, and Pliny speak of a plane tree near Gortyn, which never shed its old leaves till new ones sprouted forth.

**GORTYNA**, a town of Greece, in the northern part of Macedonia.

**GORUH**, in Geography, a town of Hindooistan, in Bahar; 62 miles W.S.W. of Bahar.

**GORY**, a town of Georgia, in the province of Cardedel, on the Kurr; 45 miles W. of Telhis. N. lat. 41° 55'. E. long. 44° 30'.

**GORZ**, a town of France, in the department of the Meurthe; and chief place of a canton, in the district of Metz; 7 miles S.W. of Metz. N. lat. 49° 3'. E. long. 6° 4'. The place contains 1535, and the canton 14,258 inhabitants, on a territory of 220 kilometres, in 31 parishes.

**GORMEGNO**, a town of France, in the department of the Stura, on the Bormida; 13 miles S.E. of Alba. N. lat. 44° 58'. E. long. 8° 17'.

**GORSKE**, a town of the principality of Magdeburg; 34 miles E. of Magdeburg.

**GOSAYPOUR**, a town of Hindooistan, in Allahabad; 13 miles N.W. of Jumnapur.

**GOSCHGOSCHEN**, a town of America, in the Delaware, confining of three villages situated on the banks of the Ohio. Its name signifies "the habitation of owls," from the number of those birds that resort thereto.

**GOSCHUTZ**, a town of Silesia, in the principality of Oels; 25 miles N.E. of Breslau. N. lat. 51° 23'. E. long. 17° 30'.

**GOSELINI, JULIAN**, in Biography, an Italian writer, was born at Rome in 1525, where he pursued his mature studies in the house of the cardinal de Santa Flora. When he was seventeen years of age he was taken into the service of Ferdinand Gonzaga, then vicerey of Sicily. He accompanied that nobleman to Milan in 1546, and became his secretary, and was afterwards taken to the court of Spain, where he obtained the esteem and favour of Philip II. Under the duke of Albuquerque he was imprisoned on a charge of conspiracy against the life of Giambatista Monti. He vindicated his own cause, was released, and admitted to public employment. He died in 1547, leaving behind him several works, that obtained for him high reputation; of these the principal are, "The Life of Ferdinand Gonzaga," "Three Conspiracies," &c.; "Rime," or a collection of poems, several times reprinted. "Dilecours," "Letters," &c. Bayle.

**GOSFIELD**, in Geography, a township of Essex county, in Upper Canada, situated upon lake Erie.

**GOSHAWK**, in Ornithology, the English name of the *Falco columbarius*; which see.

**GOSHEN**, in Ancient Geography, a territory of Egypt, situated between the Red sea and the Nile, upon the borders of Canaan, not far from On or Hierapolis, which Joseph purchased of Pharaoh for the residence of his father Jacob and family. This was a fertile spot of ground, and fit for cattle; and, therefore, as Josephus tells us, Pharaoh kept his own in that district. It was also separate from Egypt, and therefore fitted for Jacob and his family, which would be out of all danger of interfering with the Egyptians.

**GOSHEN**, in Geography, a township of America, in the county of Hampshire, and state of Massachusetts, between Cummington and Conway; 14 miles N of Northampton; incorporated in 1781, and containing 724 inhabitants.

—as Allo, a township in Vermont, lying partly in Addison county, and partly in Caledonia, adjoining to Salisbury on the west.—Allo, a township in Cheshire county, Pennsylvania, containing 866 inhabitants.—Allo, a town in Litchfield county, Connecticut, famous for the production of excellent chestnuts, containing 1493 inhabitants: 7 miles N.W. of Litchfield.—Allo, the most considerable town in Orange county, New York; about 53 miles N. of New York city; its situation is pleasant, and it contains about 30 or 70 compact houses, an academy, court-house, jail, and Presbyterian church. The township contains 2576 inhabitants.—Allo, a place in London county, Virginia, where is a post-office; 57 miles from Washington.—Allo, a town in Kennebec county, Maine, containing 570 inhabitants.

**GOSVIN CRK.**, a river of New Jersey, which runs into Delaware bay; 17. N. lat. 31° 18'. W. long. 74° 54'.

**GOSCHGOS-**
The world is Saxon, and of the same import with the Latin term evangelum, 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, who, from thence, are called Evangelists. (See each of these articles.) The Christian church never acknowledged any more of these four gospels as canonical; notwithstanding which, several apocryphal gospels are handed down to us, and others are entirely lost.

We shall here subjoin the titles of some of the principal of these 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 evinced under other articles in this work. (See Bible, Canon, and Testament.) Several of these apocryphal 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 "Apella" is not mentioned by any writer before Jerome, who places it among the apocryphal pieces of the New Testament. Apella was a disciple of Marcion, flourished about the year of Christ 136, 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 Jerome, but they unanimously concur in rejecting it, and in expressly affirming that the church receives only four gospels. Jerome 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 "Bartolomew" is mentioned by Jerome 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 before Gelasius. The gospel of "Basileides" is named by Origen, Ambrose, and Jerome, among the apocryphal books of the New Testament; but no fragments of it remain. The gospel of "Cerinthus" 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 order adopted by Cerinthus and the Ebionites, that the gospel of Cerinthus and his followers were no other than the Ebionite or Nazarene gospel, &c., 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 supposed even by several modern critics to have been a faithful compendium of some Catholic Christians in Egypt, before either of the four canonical gospels was received. The first Christian writer who cites it is Clemens Alexandrinus, who, however, rejects it, though some have supposed, that it is a fragment of the second epistle of Clement to the Corinthians, taken from this gospel. It is mentioned by Origen, Jerome, and Epiphanius among apocryphal books. Many modern writers, as Erasimus, Gratian, Crispius, Miles, suppose, that it is referred to in the introduction to St. Luke's gospel, and therefore that it was prior to his; and Dupin and F. 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 "Encratites" has been mentioned by Fabrius 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 same with that of the Nazarenes. The gospels of "Hebraicus," were some interpolated copies of our received gospels. The gospel of "Iudas Icarnos" is mentioned by Irenæus and Epiphanius as peculiar to one of the most monitory and unconfident sects that ever assailed the Christian name. The false gospels of "Lucian," who was a famous critic and martyr under Diocletian, were, like those just mentioned, corrupted, interpolated copies of our genuine gospels. The gospel of "Matthias," of which there are now no remains, is mentioned by several of the most celebrated writers among the ancients, viz. Origen, Eusebius, Ambrose, and Jerome; 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, inflicting 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 Igrarius, as some have supposed, by Clemens Alexandrinus, by Origen, by Eusebius, by Epiphanius, by Jerome; and it is mentioned by Bede, Sixtus Sevinius, Bar- numis, Caufabon, Grotius, F. Simon, Dupin, Grabe, Toland, Nye, Richard Mill, Fabricius, Mangely, 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 unfeasible 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 ENRONITES and NAZARENES.) This excellent writer elsewhere observes, it is not necessary for us to suppose, that the ancient fathers who mention other gospels, thought, "that all, if any of those gospels, were written before St. Luke's, or that he spoke of them; for Balaam and Apelles could not write gospels before the second century; and they might suppose, that several, if not all the others, mentioned by them, were written after St. Luke's. The meaning of what these 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 Serapion, Tertullian, Origen, Eusebius, and Jerome. Some have supposed, 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, suppose it to have been made by Lecessis, whom they reckon to have been a heretic of the second century; but Lecessis 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 Serapion, 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 DOetez (see that article); and he conjectures that the gospel of Balaams 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 numerous 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 province. The gospel of "Sebastianus" was composed by him who was the source and author of the Manichæan heresy. 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 "Thaddæus" is merely mentioned in the decree of poès Cæcilian. The gospel of "Thomas," or the gospel of the "Infancy of our Saviour," is mentioned by Origen, Eusebius, Cyril, Ambrose, Athanasius, and Jerome, and is unquestionably apocryphal; though this is different from the gospel of Thomas, one of the followers of Manes, the head of the Manichæans, for Origen, who mentions the former, lived a confidantable time before the Manichæan heresy was divulged. The gospel of "Truth" was a forgery of the Valentinians in the second century. This is supposed by some to be the same with the gospel of "Valentinus," 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 Canon and Lardner's Works.

GOSPAN, in Geography, a town of the island of Sardinia; 24 miles S. of Oristani.

GOSPORT, 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 considerable extent and importance; and of late years has been regularly fortified on the land side by a line of bastions, redoubts, counterartes, &c. that extends from Weovil to Stoke, or more properly, Alverstoke lake. Within the works on the Weovil side, are the king's brewery and cooperage, with an immense range of breweries 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 sloops, belonging to Weovil are employed in the conveyance of wine, beer, and water, to the ships in the harbour. On the Weovil 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 disposed into a middle and two side aisles. The work-house for the poor is a large, airy, and commodious building. Here are also several charity-schools; and some almshouses for destitute widows. The markets are held three days weekly, and are much frequented; fish and vegetables are sold in great abundance; the latter being brought, not only from a considerable distance inland, but 21 miles from the Isle of Wight. Two fairs are held annually. Several breweries are established; and a very extensive iron foundry, where numerous articles are manufactured for government. Gosport is 78 miles distant from London; the population of the parish of Alverstoke, including the inhabitants of this town, was returned, under the act of 1821, at 11,295; the number of houses being 1966. The connection between Gosport and Portsmouth is preferred by numerous ferry-boats that ply across the harbour, which is in this place about three quarters of a mile in width.

At a small distance south of Gosport, is the Royal Hospital of Hasler, 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 500 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 wages, &c. is above 5000l. annually.

Nearly a mile south-west from Hasler hospital is Fort Mounton, in 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 secures this part of the coast. On the shore, to the westward, 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 Black house, a very strong fort, defended by a formidable battery. Beauties of England and Wales, vol. vii.

GOSPORT, formerly called APPLEDORE, a fishing town of America, on Star island, belonging to Rockingham county, New Hampshire, containing 35 inhabitants; about 12 miles E. S. E. of Piscataqua harbour.

GOSS, in Rural Economy, a term occasionally applied to the common wheat in different places, and which is sometimes written getz. See FEYZ.

GOSSINGUNGE, in Geography, a town of Hindoostan in Oudes; 15 miles S. E. of Lucknow.

GOSSAMER is the name of a fine filmy substance, like cobwebs,
cobwebs, which is seen to float in the air, in clear days in
autumn, and is more observable in stubble-fields, and upon
farms and other low bushes. This is probably formed by the
flying spider, which, in traversing the air for food, shoots
out these threads from its anus, which are borne down by the
dew, &c.

GOSSEMPINUS, a name given by Pliny and the an-
cients 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 stuffings 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
recal the heat and spirits into parts to which it was applied.
It is called by Piso *arbor langera,* the wool-tree, and had
its ancient name from the words *gossypium* cotton, and *pinus,*
the pine-tree, being somewhat like the pine in external ap-
pearance, yet bearing a fort of cotton.

GOSSE-ABDIAH, in Geography, a town of Nubia, on
the Tacezé; 90 miles S. of Jalaac.

GOSSEC, M. in Biography, a voluminous French mu-
cical composer of the old school, almost the only lineal
defendant of Lulli and Rameau. He had force, fire, and
knowledge; but his style was not that of the present day,
either in Italy or Germany, nor could his friend, M. La-
bordes, 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 less
firmness, 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." Elysia fer la Mus.

Unluckily, nature alone has never made an artist. A good
painter, poet, or musician, cannot be made without edu-
cation, study, and models. Ingenious works have been pro-
duced by dint of genius, but never faultless. The awk-
wardness of self teaching will always appear; and taste, ele-
gance, facility, grace, and often learning, will be wanting to
render them perfect.

GOSSEINS, in Geography, a town of Thibet, on the
Dewah. N. lat. 30° 30'. E. long. 81° 24'.

GOSSELIES, a town of France, in the department of
Jemnappe, and chief place of a canton, in the district of
Charleroy. The place contains 2872, and the canton 12,894
inhabitants, on a territory of 100 kilometres, in 17
communes.

GOSPIUM. See Gossypium.

GOSSLAR, in Geography, a town of the kingdom of
Weilphalia, on the Gose, which runs near this place into the
Ocker. It was a free and imperial town, having on one side
the bishopric of Hildesheim, and on the other the principa-
lity of Wolfenbuttel. It was founded in the year 922, by
Henry the Fowler, and part of it re-built after being de-
stroyed by fire in 1728. It has four parish churches, two
chapels, and two Lutherian convents. Its principal trade
arises from the mines of iron and lead in the Rammel moun-
tain near it; 30 miles S. of Brunswick. N. lat. 51° 55'.
E. long. 10° 26'.

GOSSUM, a dwelling of the thyroid gland. See Brion-
ciocele.

GOSSWEINSTEIN, or Gossmanstein, in Geography,
a town of the bishopric of Bamberg, on the Putlach, 20
miles E. S. E. of Bamberg. N. lat. 49° 45'. E. long.
11° 10'.

GOSSYPIUM, in Botany, the Cotton plant. The
name is supposed to the learned by the he of Egyptian origin,
and if so, is akin to *Cotynus,* or *Cotynus,* the evi-
dent source of our word Cotton, which is given as the
Egyptian appellation of the plant in Alpinus, de Plantis
*Egypti,* 71. Pliny makes it a Latin word, though the
more common name he says is Xylus; the Greek *goss-

Gen. nat. t. 134. (Xylon; Tourn. t. 27.) Clafs and order,
Malvacea, Julf.

Gen. Cal. Ch. Periarth double; the outer of one leaf,
three-cleft, flat-lined, larger; inner of one leaf, cup-shaped,
with five blunt notches. *Cor.* Petals five, irregularly heart-
shaped, flat, spreading, attached to the tube of the flumens
by their base. *Stam.* Filaments numerous, connected in
their lower part into a tube, separate and lax above, inserted
into the corolla; anthers kidney-shaped. *Pfyl.* German su-
perior, round-lined; *style* columnar, as long as the flaments;
flagmas three or four, oblong, thickish. *Peric.* Capsule
round-lined, pointed, with three or four cells and as many
valves, with contrary partitions. *Sedus* numerous, oval,
fringed and enveloped with long wool.

Eff. Ch. Calyx double; the outer three-cleft. 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 various countries, for
economical purposes, are extremely difficult to define and
obscured by various names. Linnæus in Sp. Pl. ed. 1, defines three species only,
2. 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 be-
neath. Stem herbageous, nearly smooth.—This is annual,
with a single, bracted, often zig-zag *flamen,* smooth or only
slightly downy. *Leaves* cut half-way down into three prin-
cipal, and two smaller lateral, pointed rounded lobes. The
mid-rib bears one gland at its back, about half an inch from
the stalk. *Flowers* yellow, purple at the base. *Capsule* the
size of a walnut, enveloped in the calyx like a linden.
2. G. barbadense, taken up from Pluncken, t. 188. 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 so deep.
3. G. arboreum. Cavan. t. 165. Pluk. t. 188. f. 3.
(Cutiam-paria; Rheede 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
pennular flamen, and deep-cut long-lobed *leaves,* whose
mid-rib bears one gland, distinguishes this. The *flowers* are
dehiscent. The cotton is used in manufactures. Willdenow er-
roneously quotes Alpinus here.

His *Cotynus* is in the Plant. *Egypti.* 71, not his
Exot. t. 38, and does not agree with the East Indian
plant.

To these is added in Sp. Pl. ed. 2. 275;
4. G. birsutum. Cavan. t. 167. Leaves with three or
five acute lobes. Stem branched, hairy.—The synonym of
Tournéfort is wrong.—This is said to come from America.
It appears to us a hairy variety of the first, for the gland on
the mid-rib, which Linnæus thought an exclusive mark of
*birsum*, is found in both.

What Linnæus intended by G. religiosum, Syll. Nat.
ed. 12. v. 2. 462, is rather doubtful. He defines it
"Leaves three-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 *religiosum* in his own herbarium, which appears to us *barbarous*; though it may be what he had in his garden.

With the *herbarium* of Murray, Comm. Gott. for 1776, t. 1, we are unacquainted.—Cavanilles figures and describes several more species, especially *G. albofimbra*, t. 166, a noble plant, from Commeron's herbarium, gathered in the Manilus.—Willdenow, adopting these, reckons ten species in all, but the fynonyms of the whole genus require revision.

GOSTADT, JOTSTAD, or *Josipstado*, in Geography, a town of Saxony, in the circle of Erzgebirch; 23 miles S. of Chemnitz. N. lat. 56° 26'. E. long. 13° 2'.

GOSTIN, a town of the duchy of Warsaw; 48 miles N.N.W. of Rawa.

GOSTULLA, a town of Bengal; 22 miles E. of Kithenagur.

GOTARA, a town of Hindoostan, in Bahar; 57 miles S.S.W. of Patna.

GOTERON, a valley of Switzerland, in the canton of Fribourgh, on the N.W. of the town of Fribourgh, near the bridge leading to Bern, takes its name from the Goteron, 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, studied 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. This valley contains several mills, an iron foundery, where the ore brought from Franche Comté is forged, and a manufacture of linen and cotton, established by some merchants of Neuchâtel, under the protection and encouragement of government.

GOTH, Steph., 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 pretence of bringing the Lutheran church nearer to the simplicity of the earlier ages of the gospel, artfully alluded to the doctrines and ceremonies of worship to those of Rome, with the omission of some particular forms and expressions which would have too plainly disclosed 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 Ecclesiæ cum praefatione et notis Laurentii Upaliensis 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 Henneberg, and on the W. by the principality of Eisenach. 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 state consists of three dukes, with councils, nobility, and some barons; convoked by the prince. The reigning duke maintains a guard of 60 men, two regiments, each of which is composed of 800 men, and a corps of artillery. The chief rivers are the Leine and the Nelle.

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-canals, and is among the belt and hamlet-like towns in Thüringen. It has an hospital for the soldiers, two schools for their children, and barracks, in which the military art is taught; it has likewise a foundery for cannon, balls, &c. two churches, a good academy, a house of correction, an hospital for widows, and asylum for orphans. The inhabitants carry on a considerable trade in wood and wooden manufactures, and beer; and they derive benefit, not only from the agriculture of the vicinity, but from the paper-mills which are carried through it from Leipzig 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. 56° 17'; E. long. 10° 40'.

GOTH, a river of Sweden, which issues from the southern extremity of the lake Wener, near Weinersburg, and after a course of 70 miles, falls into the sea near Gothorp. It flows low along 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 Wener 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 Troad, and the stream of the capital are to the edent, and 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 Goth; and the space included between the Northern river and the Goth is named the island of Hisingen.

GOTHARD, Sr., a town of Hungary, near which the Turks were defeated by the Hungarians, in the year 1564; 21 miles W. of St. Crec.

GOTHARD, Sr., a chain of mountains of Switzerland, in the canton of Uri, the summit of which rises above the sea 9075 feet, though some have estimated its height to be much greater. The particular parts of this chain are called by different names: of which the principal are the Silla, Fondo, and Suringa, to the east; the Fondo, the Patina, and the Lucendro, to the west; to the north, the Urfingen; and to the south, the ridge of naked and piked rocks of the Val-Maggia. Of these, the Fondo is the highest. There are five passes on the neighbouring heights, on which are fed 200 cows, 150 goats, and 30 horses. The river Doldan has three principal sources in the chain of St. Gothard: the first is springing near the foot of the Fondo, and flowing into the Lake of La Silla, in another part of the eastern chain, and the third is furnished by the streams of mount Fondo. These three sources unite with another branch, that flows from the Fondo, through the valley of Bedneto, form one great torrent, which takes its course towards the south, enters the lake of Lucerna, and traversing part of the Maggia, falls into the Po. The source of the Rhine is also in the lake of Lucerna, an oblong piece of water, about three miles in circumference, stretching between the mountains of Patina and Lucerna, and almost entirely supplied by the numerous glaciers which crown the summit of the Lucerna. The stream issuing from this lake runs down the valley of St. Gothard, and joining in the vale of Urfingen, the two branches which come from the Fondo on one side, and from the Grison mountains on the other, flow towards the north into the lake of Lucern.
cern, and from thence throws itself into the Aar. The valley of St. Gothard is exceedingly dry. It does not contain a single tree, 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 Septimer. The Gothard was called by them sometimes Adula, sometimes the High and Lepontine Alps. The present road over this mountain begins at the village Hospitall, in the Uriera valley, and terminates on the south 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. Grevel, the gentleman to whose early exertion in collecting and in employing persons well qualified to assist him, we owe the extensive alluviation of minerals lately purchased by government for the British museum.

Though, in the high Gothard valley, the temperature is far below that of Romanum; yet, on the N. side of the mountain, the climate is sufficiently rough to make the growth of trees cease at the height of 4566 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 feared 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 confits entirely of primitive rocks, which, however, display great variety in their mixture. On the N. side veined granite, gneifis, mica-date; in the plain of the rocky valley, where the Hospitall stands, granite of large grain, traversed by beds of veined granite and mica-date; from the summit downwards, on the S. side, massive granite of large and small grain alternately, veined granite, mica-date; in the Tremola valley, on the Fiida and Sorefin, hornblende-date commences, mixed in some places with fine granular quartz, in others with feldspar, and lower down with fine reddish-brown, deodechedal garnets; over which beautiful rock the road winds, through the Pffeelel forest, down to Airolo. On the N. side, in the Uriera valley, among the left mentioned rocks, una pot-tone on the S.E.-part of the valley, and on the N. N.W. primitive limestone and clay-date; while the S. side in the Leventine, Canaria, and Piora valleys, exhibits primitive lime-date and gypseum.

All rocks of the Gothard are dipposed in slits, having a direction from E.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 fiction, almost through the whole of the central chain. The regularity of the stratification of the granite is most striking in the neighbourhood of the Rundu bridge; the slits are from three to four inches thick, and have their direction from N.E. to S.W. Likewise, on the Profa and Fiida, and southward from Hospitall down the valley of Tremola, the primitive lime-tone and gypseum, which pass on the S. side of the mountain through the Leventine, Canaria, and Piora valleys, and the lime-date, clay-date, and pot-tone, seen on its N. side, in the Uriera valley, are the continuations of the same formations that range through the whole of the Pays de Vaud.

The ridges of mountains constituting the Gothard are exceedingly broken, and bear the marks of caustic 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 shut 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 Rundu, where the Reufs forms a beautiful fall; and on the S. side, below the Hospitall, the rocks approach each other so closely, that the violent action which produced the present chasms is sufficiently evident. Before that revolution happened, it is highly probable that this considerable valley was filled deep below; and now it lies so, that the Urner-valley, before the Devil's mountain was broken through, and the upper Leventine valley, before the Platier, near Daaco Grande, was rent asunder, represented deep feas of considerable extent.

GOTEBURG, a town of Sweden, is Well Gothland, distinguished by a commodious port, and landing near the seat of Lodoe, a town built by Gustavus Vasa, which being endowed with singular privileges, soon became the great emporium for the trade of the western provinces. Charles IX., when duke of Gotland, having, in 1604, laid the foundations of a new town in the island of Hisingen, not far from Lodoe, called it Goteborg, in honour of his dukedom. 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 Calvinists the free exercise of their religion, the first place in Sweden where this toleration was permitted. By these means Gothberg 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.

Goteborg 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 river Gotha and Moldal, and almost inclosed with high ridges of bare and rugged rocks. Goteborg stands partly on the ridges, 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 conducted on piles: the upper part hangs on the declivities, and rows of buildings rise one above the other like the steps of an amphitheatre. The whole is regularly fortified; and the circumference is near three miles, exclusive of the suburbs, called "Haga," which lie 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 fort of New Elishborg, 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 Upfal. The
acts, written in the Swedish tongue, and printed in 8vo.
contain disquisitions on various subjects, in the several
branches of science, moral history, antiquities, history,
and polite letters. This population amounts to 20,000
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 Botnia, at the proper season of the departure
of ships for the East Indies, the company carries on its
commerce from Gothborg, whose harbour, lying in the
German ocean, is more open. In 1740, the herring, which
had not heretofore unusually approached the western shore
of Sweden, flocking to Gothborg, the inhabitants of Gothborg
established a fishery, which has been very lucrative. The
fishery begins in November, and though it continues scarcely
three weeks, it supplies the fishermen of Gothborg with
not less than 600,000 barrels. Of these, 200,000 are salted,
and train oil is drawn from them; fifteen barrels of herrings yielding one of oil, which is principally exported
to Holland and Spain. One barrel of salt, procured
from Spain, cures three barrels of herrings: the average
exportation of salted herrings may be estimated at 150,000
barrels, and the annual consumption of Sweden at 50,000.
An English confidant factory reside at Gothborg; and a
chapel, with a regular chaplain, is appropriated for their
use. The fortifications of Gothborg 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. 17° 44'. Coxel's Travels in Sweden.

GOTHIC, or Gorman, something that has a relation
to the Goths, an ancient people, originally inhabiting that
country which we called Gothland; whence they spread them-
Selves over Greece, Dalmatia, Bulgaria, Italy, Spain, &c.
See GOTHIS.

Gothic Architeclure, a term of reproach 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 signify every preceding species of European
architecture not conformable to them, and it was imported
in the same sense into England by Mr. Evelyn and Sir
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, mel-
ancholy, monstrosity. In the same sense, Sir Christopher
himself, speaking generally of what he terms Gothic archi-
tecture, calls it "Mountains of stone; vast, gigantic build-
ings, 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 here 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 flues and other incongruous
props, to support ponderous arched roofs without entabla-
ture." In conformity with this latter notion of Sir Chris-
topher, Mr. Kious, a professional writer, says: "Modern
Gothic is distinguished by the lightness of its work, the
excessive boldness of its elevations and of its feutures, by
the delicacy, profusion, and extravagant fancy of its ornaments."
The same 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 laureate,
Thomas Warton, who has written a great deal on the sub-
ject, and who had planned a "History of Gothic Archi-
tecture," 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 Beatson and Capt.
Grofts, 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 dif-
terent fenses in which the terms, ancient architecture, mo-
dern architecture, Saxon 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 Caxars, and still more so after
that of Constantine the Great. A century later the Ostro-
goths over-run and subdued Italy, the Vifigoths, Spain,
the Franks, Germany, the Vandals, the Roman provinces of
Africa, the Franks, France, and the Saxons, Britain.
These few barbarians destroyed innumerable monu-
ments of architecture as well as of the other arts, but
they none of them introduced a style of building different
from that which they found in the conquered countries.
They did not imprint 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, we
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 cir-
cular manner of building which prevailed throughout Christ-
tendom, 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 Roman 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 strictly Roman.

On the first introduction of Christianity amongst our
Saxon ancestors, at the conclusion of the sixth 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 his-
torians. Very soon, however, the same Roman millionaires,
who converted them, taught them to build churches of
stone after the Roman manner; for this denomination of it,
the Roman manner, (more Romano,) is always mentioned
by the aforesaid historians. The first archbishop of the
Northumbrians, Paulinus, who was a Roman monk, appears
in the chronicles to have been the chief architect amongst the English Saxon
architects at the beginning of the seventh century, He built churches of
stone at York, Lincoln, and other places. His next
successor but one, Wilfrid, 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 then it is expressly recorded,
both of him, and his rival in architecture, Benedict Biscop,
abbot and founder of the church and monastery of Wear-
mouth;
mouth, 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 this 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. Bentham, in his “History of the Church of Ely,” or rather the poet Gray, who drew up the architectural part of that work, refutes Sonner, Stewley, 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. If we 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 last 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 sorely 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 at least was the case with the Northern men, who settled in that part of France, which from them has since been called Normandy. A lasting 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 moved 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, previously to his invasion of England, built two noble churches and abbeys, and his nobles, not fewer than thirty-eight, each of them building with the zeal to make his building the most magnificent and splendid. Such were the Normans, the bravest, most industrious, and most religious people, and the most elevated, in particular, to ecclesiastical architecture of all Christian people, when William, their prince, with the power 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 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 Gundulphe, 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 these structures were evidently the fabuline and beautiful. To produce the former effect, they built their churches along 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 objectionable 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 mould these 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 first ascertained influence of it 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 systems which have been published respecting it.

It has been seen above, that Mr. Evelyn and Sir 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 applause by the latter, says, in his “Parentalia:” “The Goths and Vandals having demolished the Greek and Roman architecture, introduced, in its stead, a certain fantatical and licentious manner of building, which we have since called modern Gothic, of the greatest industry and expensive carving, full of fret and lamentable imagery,sparing neither pains nor cost.” We fee 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 so 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 attributing 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 every where 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 sir Christopher commands the stylem of his friend Mr. Evelyn, he himself departs from it, since he prefers the word Saracenic to denote the pointed style.

“What we now vulgarly call the Gothic,” he says, “ought properly and truly to be named Saracenic 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 Wykeham, by Rionus, by Warton, by Grofe, 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 Jerufalem in 1099. Now it is certain from history that the cathedrals of Exeter, Rochester, and Chichefter, 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 Rochester cathedral, which was built by that greatest architect of his age, Gundulp, formerly a monk of Bec abbey, then bishop of Rochester, 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 is, because Gundulp 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 Grofe, Bentham, 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 Pocock, 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 assertion, 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 musical scale of bells, optical glaftes, the mariner's compass, gun-powder, and printing were discovered in the East instead of the West, contrary to the known fact.

Mr. Murphy, to whom the admirers of pointed architecture are indebted for his elegant views of the church of Brothla in Portugal, conjectures that this style was borrowed from the pyramids, and that of course Egypt was its native soil. But in almost every country and age men have built their habitations with sloping roofs to carry off the falling rain; hence they must have seen 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 caftle of Cairo, called Joseph's Hall, which is a great deal in the pointed manner, and which is supposes by the vulgar to have been built by the patriarch of that name; but Nebular 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 prisone,: after the third crusade. Mr. Murphy's theory is equally destitute of historical grounds and moral probability.

Bishop Warburton, in his "Notes on Pope's Epitaph," endeavours to unite together two of the above-mentioned reputed systems, which derive pointed architecture from the Northern Gofs, and that which brings it from the Eastern Saracens, at the same time that he aligns the western peninsula of Europe for the real place of its birth. The following is an abridgment of his account: "When the Gofts 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 refemblable groves; at once indulging their old prejudices, and providing for their present convenience by a cool receptacle in a sultry climate, with the assistance of Saracen architects, whole exotic style of building suited their purpose." All this is a mere revery. The Gofs 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 Christian, 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 cooped up the Christians in the mountain of Atarjas, there continued ever afterwards the most relentless warfare between the two people. It is impossible to conceive more monstrous ideas than that the Christian Gofs 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 300 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 practiced 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 see was the fact. After all, if the style 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 a company last to the fourth, namely, into Italy, the cradle of modern art, with a promise that he will there point out to us much earlier specimens of this style than are to be met with in the northern climate. In the year 1829, Mr. Smirke, F.S.A., returned from Italy, laid before the Society of Antiquaries a certain drawing, since engraved in the "Architectural," vol. xiv., of the drawings of a window belonging to the cathedral of Meffina, 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 13th century. These drawings he would have us believe are equal with the cathedral spirit, which was built by the Norman chief, Roger, earl of Sicily.
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 Diotti Salvi in 1132. The drawing exhibits what we should call Roman and Saxon work, with interiorized crocketted pediments and pinacles, such as we were unacquainted with for more than a hundred years afterwards. Lollly, this gentleman flew a view to the cloister of Campo Santo, adjoining the last mentioned cathedral, built in 1254. Here we see the richest tracery milliions under semi-circular arches, the whole of which he considered as being the same original work. These specimens gained many converts to his syllem, that of Italy being the parent country of pointed architecture.

But there is no error which we have so much to guard against in studying architectural antiquity as the confounding of sublateral alterations with the original work. There are few adepts in this science who would not start at the first sight of Mr. Smirke’s drawings, and who would not pronounce the works they represent as an incongruous 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 enrichment 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, the very 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 syllem of bishop Warburton, is that of Sir James Hall, bart., who, in “An Effay on Gothic Architecture,” now published, endeavours to flew that the pointed style was borrowed from the idea of upright palls surrounded with offer, the heads of which are to meet like those of trees in an avenue. But the utmost that the ingenious baronet proves is that basilica-work may be made to resemble pointed architecture, not that pointed architecture was borrowed from existing models of basilica-work. Lord Orford, heretofore for Horace Walpole, in his “Observations on English Architecture,” says, that the architecture in question was copied from shrine-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 artiffs learn to fashion their shrines in the pointed style? Lally, 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 falle syllems. We have been 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 possessed of the most ardent passion for ecclesiastical architecture of any people we read of; and that they vied with 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 subsequeint to their construction, and which sometimes cover the whole of them over; as we see on the outside of St. Botolph’s priory, and St. Olivy’s abbey in Effex, and in the basement story of the inside of Durham cathedral. These arcades the architects diversified in a great variety of ways, as may be seen upon the tower of St. Angeline’s monastery in Canterbury, built by the Norman abbot Scauldoun in 1280. 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. These plain and intersecting arcades were sometimes irregularly intersected, as in Carlepho’s and Flamard’s work on the north side of Durham cathedral; and sometimes placed in alternate rows, as in that of Remigius on the facade of his church at Lincoln. The pointed arch thus formed appeared first in mere batts reliefe, as in the above mentioned instances, 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 abbey churches of Glastonbury and Runneby. 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 croffing arches in the choir of St. Crofs near Winchelsea, 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, Crofe, and others, or else 1130, according to bishop Lowth, who had examined the records of this foundation, and Rudborne, the monk of Winchelsea, 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 Winchelsea, and another monk who wrote the “Annales Wintoniensis,” bishop De Blois rebuilt his episcopal mansion of Farnham in Surrey, where his succellers still ordinarily reside. Now in the ancient part of this building, we see at the present day pointed arches reposing upon circular Saxon columns, just as we do at St. Croe; and no architectural critic, with these documents before him, will hesitate...
state a moment in pronouncing them part of the work in question, executed by De Blois in 1138. As the fame pro-
late restored the abbatial church at Rumsey, where his
niece Mary was a nun, and as he himself had been abbot
of Glastonbury, 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 fame
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 amals both of St. Wurzburg's abbey
Cheller, and of Peterborough abbey, quoted by Dugdale,
that Biddwas 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 1135
or 1139; it probably 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 Kirkstall abbey, Lanctony
abbey, and several other ancient structures. If we may give
implict credit to the testimony and the plates of captain
Gros, 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 com-
mand 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 pro-
selled 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 tradi-
tionary accounts, to attribute to our countrymen, has af-
firmed 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 unacquainted with the historical evidence on
which the above-mentioned early instances of the pointed
arch in England rest, and that he was even at a loss to de-
termine which of the works at St. Denis really belonged
to the period he has alluded. If we examine the pointed
windows of this abbey, exhibiting different transissions of
the first crucifix in Montfaucon's "Monarchie Françoise,"
which windows are said by this great antiquary to have been
executed by abbot Sugar in 1140, we shall not find the
appearance of a pointed arch in any one of them. It may
be added, that in the famous tapestry of Bayeux, represen-
ting 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, fibries, and other architectural works there
displayed. In a word, throughout the whole of Montfaucon's
places, 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 ob-
serves these sometimes to consist of plain semicircles crossing
each other, as on the outside of the south transept of Wal-
krelyn's work at Winchester, and on the north transept of
Warwell's work at Exeter, forming in the latter case simple
pointed arches; and for instances we may name that an
intersecting roll upon pillars, each of them being intersec-
ted by a capital, or at least with an abacus, as on the
north transept of Durham, and the west front of Lichfield
cathedrals. In the latter case, we have the appearance of
pointed arches with lateral points, or cusps upon the heads
of them, as Sir James Hall has very aptly observed. This
addition to the pointed arch was occidentally made in the
first period or order of pointed architecture, but afterwards
it became universal. The addition of another cuspid or ex-
sive of the pointed arch turned its trifoliate head into a
foil. In like manner, four of these cusps being placed on
equal dailances within that circle or "L'Œil du Bœuf,"
which the Roman and Saxons architects had been in the
habit of placing in the tympanum of their pylons, transof-
med it into an elegant quatrefoil or crofs. By means of
additional cusps, and circles within circles, the cathedral of
the Wheel, or Marygold window, as it is called in England,
"La Roche du Pontus," as the French term it, was easily
produced. In all the works executed during the middle
and latter part of the twelfth century, a confused and in
trigent mixture of styles is every where discernible, as
might be expected where circular 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 1180, arches of the
sharp point, rolling 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
column began to be shaped like the Arabic numerical
figure 8, so as to retain its former strength, and to appear
gracefully slender; and where columns were made use of
more for decoration than for strength, as for example to
support ornamental arcades, or the corners of windows
or doors, very thin detached columns were employed,
and those for the most part made of Purbeck or Pentworth
marble. We have a striking and most interesting example of
these and other improvements which took place in the point-
ed 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
most incomparable advantage of perceiving a circumstantial
account of this rebuilding, and of the differences between it
and the former structure, raised a hundred years before by
archibishop Lanfranck, which account is drawn up by the
intelligent monk Gervase of Canterbury, who was an eye-
witnenss of what he relates, we shall submit some of the
most material parts of it; he tells us that, the pillars of
the new choir were of the same form and the same width
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 Lanfranck's work, but that there was an
incredible number of them in the work of the two
Williams; that therones which he raised the ancient
arches were cut with a axe, but these of new arches with
a chisel.
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a châtel; that the vaulting of the side aisles of the choir was plain, whilst that of the new choir was groined and fixed with key-stones; that the former choir had a flat ceiling ornamentally pointed; but that the succeeding choir was elegantly vaulted with hard stone for its ribs, and light toph stone for the interfaces; finally, that there was only one triforium, or gallerie, 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 these and in other particulars with this description of it, given 500 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 sort of Corinthian capital, and except the arches springing from these pillars, which are also circular as far as the console abside or altar end, these being pointed, 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 1192, under the direction 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 so intent upon the work, that, as Matthew Paris tells us, he carried mortar and stones on his own shoulders for the sake 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 Grosetete. Excepting the west front, which is almost all the work of the Normans, prelate Remigius, and the towers, the groining, the screens, and certain other decorations added in the fourteenth century, the whole vault pile of St. Mary's church and Chapter-house at Lincoln is in the simple style of the first or lancet order of pointed architecture; but awful and beautiful beyond the conception of those who have not seen it, and greatly superior to any church of the same order and period to be found in France. In 1222, the rich and powerful bishop Godfrey de Lucy, amongst his other great works, began to rebuild the eastern part of his cathedral at Winchester, which he executed in the style of the Metropolitical choir, but without the vault mixture of the Saxon. His extensive work is still to be seen there, confounding of long narrow sharp-pointed windows and other arches, detached pillars of Purbeck marble, quatrefoil mouldings, and light groining of simple intersecting ribs. And, whereas, it became very usual, for the sake of the gracefulness and utility of such windows, to place two of these narrow arches close together under another pointed arch of greater width, in consequence of which a vacant space occurred between their heads; a trefoil, quatrefoil, or cinquefoil was frequently introduced, with the happiest effect, to fill up this space. In 1227 archbishop Walter de Grey began to rebuild the northern Metropolitical church of York in the prevailing style, and he actually finished the south crofs aisle as it is now seen. The same kind of work was going on at this time at Worcester, Salisbury, and other cathedral and abbey churches. The last-mentioned church, which was an entire new foundation, begun by bishop De Poore in 1220, and finished by bishop Bridport in 1258, exhibits, in its front and other parts, the double lancet arch, with the intermediate quatrefoil rofe, and all the other cha-

rafters 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 still more striking improvement 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 very 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 the springing of the arch, and generally resting on some small flower or other light 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 Poore, 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. Whilmt the work at Salisbury was drawing towards a conclusion, that at Westminster 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 III. 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 cinque-foil 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 order, and very near to each other, 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 statuary.

During the reign of Henry's son, Edward I., which began in 1272, 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 alpining 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 able 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, fo as to form trefoils, cinquefoils, or sepfoils. In like manner the pediments or canopies over the arches were universally purfled, 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 mostly exhibited buls of the founders or other benefactors of the establishment. Pinnacle, 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 purfled and surrounded with rich finials. A pinnacle of a proportionable fl-
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the nave 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 these aisles, in what are called flying buttresses. The window no longer composed of an arch divided by a simple mullion, and surmounted with a single or a triple rote, 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 transoms running across them. Their heads also were varied by tracery work into a variety of architectural designs, and sometimes, as at the west end of York, into the form of a beautiful flower. The plain niches of the thirteenth century, in the fourteenth, groined, large and beautiful, in which much architectural skill was often displayed as in the whole church of which they belonged. These tabernacles, as well as various other parts of the sacred 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 straight, began to humour the sweep of the arch, by which means they became less high and more graceful.

We have instances of these improvements, or rather of this new order of the pointed style, in the three remaining architectural crofts, erected by Edward I. the elder of Northampton, 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 Weftminster abbey, who 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 1290 and 1355, 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, Weftminster, now the house of commons, which Edward III. began to erect in 1348. Of the inimitable beauties of the latter erection, only a few scattered vestiges remain, to shew 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 considerate part or other of them, according to this improved order. Before 1221, bishop Langton had added the Lady chapel to his cathedral of Litchfield, and groined the nave and choir, and had erected the magnificent western façade. About the same time the greater part of the nave of Weftminster abbey church was rebuilt. Between the years 1327 and 1349, Exeter cathedral was groined, and its heavy Norman arches and pillars were changed into light and graceful pointed arches and clustered columns, by its ministerial prelate Grandison. During the pontificate of archbishop Courtenay, which began in 1351, and that of his successor Arundel, the nave of Canterbury was rebuilt. During the same period, that elegant prelate and architect, William of Wykeham, was employed in performing the same difficult transmutation of the same 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 cased and the latter reduced to a point. This may be ascertained by an attentive examination of the work within the roofs of these structures; and without this trouble, by simply looking at the nave of Gloucester, St. Albans, or Romsey 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 tale for these improvements is described even to country parish churches, few of which did not lower 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 the perfection of their race, tend towards their decline. This was the case with that singular invention, pointed architecture. Its rise, progress, and decline, occupy little more in the chronology of the world than four centuries. As its characteristic perfection consisted in the due elevation of the arch, so 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 fourteenth century, and is to be seen in the royal chapels of St. George, Windsor, of King's college, Cambridge, and of Henry VII., Weftminster. 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 displayed this at the expense of the style itself, 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 ten 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 pointed than awkward; hence those royal chapels, and several mortuary ones built in Winchester, Peterborough, and our other grand churches, during the time of the two last Henrys, are seen covered over with tracery, and loaded in their groins and friezes with buds, armorial 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 admiring them, falls not to prefer to them the chaste grandeur of York Minster, or even the unadorned majesty of Salisbury cathedral. The church-windows of this period were so multiplied and enlarged, as to become what a late writer, Mr. Whittington, professes to admire as all windows, but which they certainly could not become without great detriment to the character of awfulness in the church itself. The same depression of the pointed arch took place on the outside as in the inside of the buildings of this period. Instead of the tapering pinnacles and lofty spires which had hitherto adorned the towers of churches, these structures were now generally covered with round cupolas, and the portals, instead of being surmounted with crowned pediments and graceful pinnacles,
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 1502, in a very simple fashion of pointed
architecture, and bishop Fox repaired the prebbytery and chan-
cel 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 depreciation of its sublime
and graceful arch. The deflection of it was complete
at the beginning of the reign of Edward VI., from which
period, till the introduction of the pure Greek style in
the reign of Charles I., a real Gothic, or at least a truly barbaric
style took place, consisting of a confused medley of all
the known styles and orders of styles, intersected with globes,
triangles, pyramids, obelisks, friezes, 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 con-
quest, 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 cluster columns, the aspiring cornice or pedi-
ment, the crocketed pinnacle and lofty spire, with the other
ornaments mentioned above, actually grew; that this style
was not borrowed from Northern Goths, nor Eastern Saracens,
nor Western Moors, nor 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 fonder 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 depo-
sition from her defeats; that there are three distinct orders in
this style, the members and proportions of which can be dif-
tinctly 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 Greek orders; on which
subject it may be observed, that these Greek 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 lasted 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 per-
fect or equilaterial 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 first-mentioned pe-
riod, and lasted 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,
none of the learned, as well as the vulgar in general, still call it
the Gothic, others the Saracen, 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 con-
cluded, 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 press 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.

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 bends, espe-
cially at the beginning and ending of each letter.

The manuscripts in Gothic characters 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 trans-
lated 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 cap-
tals 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, Michellus (Intro. to the N. T.) thinks it
natural to ascribe the said version not to the Franks or Ger-
mans, but to the Goths, who lived on the borders of the
Danube; or in Wallachia, where they at that time resided,
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 ex-
pected. Some of the words in this version are still used in the
Lettich Tartary, the ancient seat of the Goths; e.g. "facilis,
" to do;" from "facio, "to do," a word that is quoted by
Bobeck, from the language of the Crim Tartars. In this
version, many words are adopted immediately from the
Greek; e.g. ort, orta, orter, father; ann, am, the shoulder,
where even the s is retained from the Greek termination, &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 Salazarian words, such as
"fam, "a matter, which prove it to have been written in the
dialect of a nation that bordered on Sarmatia. The same
may be said of many Latin words: such as "amabilis, accu-
cumere, to sit at table, "militantes, "militantes, soldiers, ohyse,
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
language was current at this very day. Ulphilas himself lived in
Wallachia, and had in his power at least to make use of Latin
letters, as well as those of the Greeks, with whom he had
continued intercourse. See Gothic Language.

The Runic characters are also frequently called Gothic
characters. See Mabillon, De Re Diplomat. lib. i. cap. 2.

But
GOTHIC LANGUAGE.

But they who take the Gothic characters to be the same with the Runic, are mistaken; as is shown 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 fancies of its records, and the circumstance of its having been utilized only by few among the learned, have rendered it a matter of great uncertainty as to its character and origin. The questions respecting its antiquity and genius are resolvable in those in regard to the people who used it. Mon. Mallet, in his "Northern Antiquities," supposes that the ancient Gauls and Germans, the Britons and the Saxons, were all originally one and the same people; and thus he makes the Gothic the same with the Celtic tongue. This opinion, which was first taken up by Cluverius in his "German Antiquities," has been since adopted by KEYFIER in his "Northern and Celtic Antiquities," and PELLONIER in his "History of the Celts," and maintained by them with uncommon regard. According to these writers, the ancient and original inhabitants of Europe consisted only 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 Sauromates, were the ancestors of all the Scythian tribes, viz. the Poleis, Ruffians, Bohemians, Wallachians, &c. who continued 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 Mon. 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 descendants 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 Gauls, Britons, and Irish; the other Gothic or Teutonic, from whom the Germans, Belgians, Saxons, and Scythesians derived their origin; and that there were ab origine 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, on the authority of Hicks, as quoted in the preface to his "Institutiones Grammaticae Anglo-Saxonicae," gives the following genealogy of the two languages. Gothic is the parent of 1. Old Saxon, or Anglo-Saxon; 2. Frisian or Franco-Theotis; 3. Cimbri, or Old Icelandic. From the first, viz. the Anglo-Saxon are again derived English, Broad Scotch, Belte, Low Dutch, and Frisian. From the Frisian, are derived German, or High Dutch, German of Swabia, and Swedes; while the Cimbri, in its turn, gave birth to the Icelandic, Norwegian or Norse, Danish, and Swedish. On the other hand, the Celtic is represented by the same writer as the parent of the ancient Gaulish, the ancient Irish, (ramified into the Cornish, Armonian, or Brit-Breton, and Welsh,) and the ancient Irish, which was subdivided into Manx, or language of the Isle of Man, into Erse, 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 such, Dr. Percy affords from its being the language of Teuton, the great father and deity of the German tribes, as from the Teutones, the people who used it in the name probably with the Cimbri, or as the Greeks called them, Teutoni, who inhabited the northern regions, and more particularly, the Danubian hills. 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 primeval 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 show 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 primeval 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 disseminate their predecessors, who had no other resource but to seek new habitation in remote regions. As the 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 their 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 those 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 affixed in one country the appearance of being independent of, and unconnected with those used in other countries. Now, if we suppose that the Celts were the first emigrants from Asia, who, prevailing Europe, settled in Gaul, Old Spain, Britain and Ireland; while their brethren, under the name of Celti (Goths), Storians, 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 to the common primeval tongue. Nor would there be material difference in this condition, though we should suppose, with many learned men, that the inhabitants of the North of Europe came, not from the East, but from
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 oriller 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 left 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 influence 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 attained 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 was indeed matter of great curiosity if some records of the Celtic and Gothic tongues had been preferred before they were yet modified by the attendant 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 primitive Gothic from the remnants of a version of the New Testament, effected by Ulphilas, into the dialect used by the Goths in Moesia, and hence called Mero-Gothic.

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 offshoots, 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 effectively resembled each other. The Lord’s prayer is thus rendered in the ancient Gothic of Ulphilas.

1 Atta unfar thi in himin 1 Father our thou in heaven
2 Veilmai name their 2 Be sanctified thy name
3 Quinmai thildmaius theins 3 Come thy kingdom
4 Vairthai Vilga theins fuc in himina, gah ana airthai 4 Be done thy will be done in heaven, also on earth
5 Hialf unferana thana feintian gaf uns himinadiga 5 Give us this day the bread of Paris
6 Gah afet uns thari feulan figanian, fua fe gah vevs alisiam than feulum unferan 6 And forgive us that we are debtors, as also we forgive those our debtors
7 Gah ni bringais uns in fratstubgai 7 And bring us not into temptation
8 Ak laudt uns aithanna 8 But deliver us from evil, ubelin, Amen.

The following is a specimen of the Celtic, as existing in the Welsh tongue:

1 Ein Taad, yr hwm wyth 1 Ourfather, the one who
yn y Neboth 2 Our art in heaven
2 Statheidler dy enw 2 The halbed thy name
3 A bryster dy deuranns 3 Our Thy Kingdom
4 Bydded dy Euyllys ar 4 Be thy will on the earth
y ddaiar meigis y mae 5 As it is in the heaven
yn y nevyth 6 Give us this day our daily bread
5 Dyro i ni heiddyw en 6 And remit to us our
barn barwyddiel debts as we remit to our
6 A madde ni ein Dy- debtors
ledion fel y maddeuwn 7 And lead us not into
6 ni ein dyledwywr trial
7 Ag nae arwain ni i 8 But deliver us from evil,
brofodigath 9 Amen.

We propose next to lay before our readers a brief analysis of the two specimens, which it is premised 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 בֵּית, pronounced with an initial and closing vowel, is adda, and signifies beer or wine, and this is the source of the Gothic atta, and the Greek αὕτη, with the usual propriety applied to a parent as the dearest object of love. The fame word in Hebrew is written יָמָן, doom, and is no other than the Celtic tand, under a difference of character. In the Cornish it is tam, in the Irish fettia, in the English other, and the old Cantabrian or Basquean atta, father. Unfar is the Greek προφετής, thus strangely corrupted, but, unser, unser; and hence the English our. In the same manner, tym, has degenerated into wuns, won, us. The Celtic ni is the Hebrew and Arabic pronoun יָנָה, and, which, founded with only the closing vowel, is 31 us, and with only the initial ein, our. The Gothic in and the Welsh yu have originated in the Greek εῦ, or the Latin in; but it is observably that these languages use this preposition as it is used in Latin, when followed by an accusive noun in the sense of into, unto, or to: thus in fremðbygnæ, 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 coalesce with the succeeding one, is sometimes changed, and thus made to unite both into one. Thus tym, which is yw hwn, the one, where r or rh (aspirated after the manner of the Greek χ) is prefixed to yw, the Latin unus, or the Anglo-Saxon an. Why, moreover, is a coalition of any fy art ibus, or thou art; any being the substantive Gothic verb to or won, whence the Goths derived their in, and the English our an. The Greek προφέτης, tempeli, or cloud, by softening the guttural into an aspirate, of which we shall presently give some more examples, has in the Gothic degenerated into browning, the place where the tempests or clouds reside, namely, the fly or heaven. In the Franco-Thorifte the same word is browning, and in the Cumbric browning. It exists also in the Celtic; but there it has retained its original sound and sense, under the form of ratum, a cloud. It is singular that the same association of ideas, founded on the nature of things, has transferred the Greek εὐ, or the Latin nubes, to signify in Welsh heaven, under the shape of nef or nefaid.

2. Veilmai is the verb of veil or veils, kilt, which is but the Greek προφέτης, with the ablative a substantiated for the aspirate, as the old Latins have done in numerous inclusions, some of which we shall presently produce. On the other hand, samtindier is familiar, converted by the Welsh into a verb; while dy
The Gothic language.

d is the same with the Gothic the, and no other than the Latin in, or the Anglo-Saxon ige, or the English thing. The Gothic thein, it is obvious, has given birth to the English form of thing. Name, whence our name, retains the Persian character of ige, though perhaps it is more immediately derived from *manan, and is a kindred noun with the Welsh an, which probably degenerated from *mōn, by dropping the last syllable.

3. The Arabic ʾydyn, queen, legs, has given birth to the Greek γυναῖκα, to use the legs, i.e. to come, and to the Anglo-Saxon ige, and our come. The same word has been imported into the Celtic in the shape of *commun, signifying to hop or leap. The same word exists in the Shanfer, unmum, to go. The corresponding Welsh dened or dywad, is the Greek γυναῖκα, τήν, or τίνι, to stretch to an object, which last depended from the Arabic ʾydyn, at, by dropping the initial vowel. The same verb exists in Welsh, under the different figure of thowyn or thoryn, and is no other than the English to, to conduct. The Gothic thiudan, a kingdom, seems originally to have meant the emperor of a divided nation, from the Greek *thiwos, and *ihos, or *ihos, as the offspring of the former exists in this tongue: thiud, gent, nation. On the other hand, the Welsh dywys is the Greek ἤπως, corrupted, by the transposition of r, into thos, or dyros. Our English thorn conforms to the original in sound and sense. In the Anglo-Saxon the corresponding word is yrce, which still exists in such English compositions, as hophen, i.e. the dominion of a bishop. In the Great Indian language abovementioned, this term figures under the character of yrph, meaning earth, and which is nearly the same in sound and sense with the Anglo-Saxon yrce, or our rice, and the Latin rēs, property.

4. As light or air is the chief medium of existence, the Hebrew term נֶפֶשׁ, otsias, gave birth to the Latin eram, erat, and the Gothic wair or verthorm, to be, to become. The Welsh yrdded, which exists also in the form of leu, and which is the same with the Greek δύναμις, and the Latin virtus, descended from the Persian bodan, to be. Wilka is ʾbāša, or ʾbēa, with ga annexed, by an analogy common in the Gothic tongue. The Welsh yrddw, or yrdd, prefixed, yrddlys, has flowed from the same source; and under the former of these forms is nearly allied to the English will. Sue is our se, or the Greek ἥσσος, or σέ, and in the name of Salei, a reverend, a fete very common with monosyllables in the ancient languages. Gab came from *ūl, and *ūl, which, in composition, means up, and has given birth to the Gothic geno of upon. Airghai is the Arabic arid, from the Hebrew יָרָץ, ares; while the Welsh arfer, or it as otherwise written, ʿer, originated in terra. The Hebrew יִבְרָץ, aber, the parent of ʾbrz in Greek, of *ber in German, ofer in Gothic, and over in English, has contrived in Celtic into ar, in the sense of upon.

5. The Arabic ʾydīn, dīb, fūd, is the origin of the Greek ὑδάς, and the English bath. Than, or than, is the accretive article τὸν. Sinim is formed from the noun ʿayn, scissurae, change, which is no other than the Hebrew יָמָע, or יָמַע, ʿayn, and ʿayn, that change or period of time called a year; hence ʿayn came to signify continued, or perpetual. Our Lord, we believe, by the clause ʿayn ʿayn ʿayn ʿayn ʿayn, 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 Greek translator, who has rendered it ὑδάς sinim, the eternal bread. In Hebrew, Arabic, and Persian, ḫēb, ḫēb, denotes the palm of the hand; hence it came to signify the action of the hand, which consists either in imparting or receiving. In the former sense it gave birth to the Gothic gíz, and in the latter to the Latin capio. Hirminige means this day; hūma, or as we write it, him, being the personal pronoun used derivatively, and dies, or dāg, 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 than days.

The Welsh yrde, in the same veric, is the Greek ὑρδα, a gift, converted into a verb. Heldydyn is a dissociated form of huley, which last is only a contraction of brei dīe, this day. Buru is a word which exists in all languages. Its origin is the Hebrew יָבָע, pluralus, fruits: and hence, יָבָע in Greek, farr, and parso in Latin, handeth in Cimbrice, beast in Francize, breadth in German, braudo in Norse, bred in English, bred in Danis, and breu in Frisie. Brongydyn, rendered daily, appears to be composed of breu, a top or formns, and yddel, the Latin dixs adjectived, and means a top of each day, or a head of each day, i.e. daily. This word is also used beynydel, beyn being a corruption of pen, a head. The Welsh are fond of this expression, and have a phrase, poch dyrb ar y pen, each day on his head, meaning every day in succession.

6. Aftar, i.e. of after, or 1s. dū, distant to 2s. Thatis is a corruption of the Greek τοιαύτης, but or that thing, and is thus the parent of the English that; hence the realambence of the explanation which the celebrated Mr. Tooke has given of such phrases—remit us to that thing, τοιαύτης, festeus sines, we are debtors, s Delaws were peroni under command, under obligation or debt, from the Greek ἰδεπτοι is labouer: hence appears to have been derived our fudgement, a mean domestical servant. In ancient times labourers usually paid their rents in kind from the products of their fields; hence, in Greek, the tenant was called ἱδεπτος, in the same principle, in Gothic, the word signifying to labour, came to signify to owe, or to be in debt. Signina is only the Latin sūna corrupted by the infection of ga, a particle of frequent ufe in Gothic. The Welsh a math, or as it may be written, ammaddus, is a compoite of ag addde, and remit, the first being the Latin conjunction ar, the second the Greek μετα, the fame with μετα, to disjunt or remit. Dyedlen, the plural of dykel, is the Latin delites, things to be eradred, or to be cancelled by being paid, i.e. debts. The noun u, or the plural u, which in this tongue is to often added to the name of a thing, is but the Latin vir—dyldwyern, dedum or delverns.

7. The Goths and Anglo-Saxons corrupted ʿayn into ieran and bringan, and hence our to bear, and to bring—in bringan, do not bring us. The Latin in Gothic is mi, in Anglo-Saxon and English is, in Welsh na or nge. Frafitben is the corresponding noun of freifan, to tempt, and appears to have been borrowed from the Latin perfite, and therefore primarily meant perfite, starlhtvs. The Welsh arman is the French rien: with the vowel a prefixed, and is the same with our rites: 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 rent is regna, to rule, direct. Prefixedh th affection denotes experience, and its origin is the Latin præfite, which last is derived from the Greek προσφέρω, προσφέρα, or the corresponding verb προσφέρω, to take or offer.

8. The Gothic ʿak is the Latin aca, though used by the latter in a conjunctive, by the former in a disjunctive sense— but. The root is ʿak, or the thence derived ange, whence the Gothic anag: and at, conformably to the form of this last
left verb, is also written ane in the sense of name, same. The corresponding Welsh word is eithe, derived from *epeis, 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 allea, but, originated in alloa. Laufen, which has given birth to various words in Anglo-Saxon and in English, and among the number to loafe, leafe, relafe, let, is apparently the offspring of the Hebrew י֛וָנ, bus, deedo, receed: to deliver from evil is but to cause to receed from evil, and thus laufen corresponds in sense as well as in found to the original. A boole character is a character freed or loosened from the rules of sobriety and justice, and this deviation from rectitude is implied in the original י֛וָנ; while the compound relafoe comes close to the Gothic signification of laufen, to deliver. The Welsh which answers to this is gwared, and is no other than the Latin gerae, (properly pronounced guero,) to manage, to carry. The Arabic يُحَرَد, phard, 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 θυρις in Greek, peæ in Latin, free or from in Gothic, sfeda in Cimbric. In the Anglo-Saxon m is annexed, and hence our word from through the Scotch ufe it in the original purity of sfeda. The corresponding Welsh rhads, which means far distance, has retained with great exactness the found and fene of يُحَرَد, phads, its Hebrew original. The Gothic uhol, German uhol, Anglo-Saxon iffe, and English evil, is the Persian and Arabic يُحَرَد, bus, with a vowel prefixed. The Persian tarik, is the parent of the English dark; and as darkness was the symbol of evil, or of the suppolled demon which created it, the Celts received it to express evil under the form of dręs: and it is remarkable that the same word with alpha privative is used by the Greeks to denote a contrary fene, δραστης, not dark, ingenious, sincere, true. In the same language ἐρασης means an import, which the lexicographers, misled by mere similarity of sound, have erroneously referred to ἐρέσης, 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 Aftatic 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 speculating a feature in these tongues, which, in a remarkable manner, befits 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 ge or ge prefixed to words, and especially to verbs. The Gothic sometimes infers g in the middle of words, and frequently before the infinitive termination of verbs: see, or auger, is weifgen, and *weifgen, to decide, blaghen, 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 Celtic, if we may judge from the Welsh, was distinguished by the same characteristic feature: thus, the Latin vis is gaor; vinum, γυριν; vagus, gwaer, &c. On this principle is, like, as, in Welsh is wngis, which bears the sense of the original. The identity or similitude 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 Iran long before the Aryan government; that it was in truth a Hindoo monarchy, though, if any chue to call it Cufcan, Caffean, or Scythian, we shall not enter into a debate on mere names; that it subsisted many centuries, and that its history has been ingrained on that of the Hindoos, who founded the monarchies of Ayodhya and Indraprokha; that the language of the first Persian empire was the mother of the Sanskrit, and, consequently, of the Zend and Parth, as well as of Greek, Latin, and Gothic; that the language of the Aryan was the parent of Chaldäic 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 Persia, at the earliest dawn of history, the three distinct races of men, whom we described on former occasions as poïcflors of India, Arabia, and Tartary; and whether they were collected in Iran 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 skirts of India by a considerable gulph. No country, therefore, but Persia seems likely to have sent forth its colonies to all the kingdoms of Asia: the Brahmans 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 Persia 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 cymnologists, were the sons of Madai, and even they were conducted by princes of an Aryan 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 laborious researches, that the Goths or Scythians came from Persia; and another contends, with great force, that both the Irish and Old Britons proceeded severally from the borders of the Caspian; 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 Persia, 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 fancifully supposed, or eastward, as with equal reason might have been ascertained, 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
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and of Asiatic origin; that they used the same language derived from the primordial 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 similarity subsisting between the Gothic and the Celtic tongues. From his silence we may conclude that he was not: and if he had seen 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 Persia. The three languages, therefore, originally resembled each other, not merely because they borrowed some words one from the other, but because they had the same words, phrases, and even conjunctions, in so far as any of the distinct languages had 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 abound: these, by degrees, fastened into a mere aspirate; and this aspirate was, in very numerous instances, substituted a labial letter wo, or ω, or f. Thus ανδα, a ling, degenerated into bain; and being introduced into Greek in the form of ψανή, or ψαντο, was pronounced ψανές, ψαντο. 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 Æsop to study: the corruptions of pronunciation, therefore, prevailed, and the digamma was universally substituted for the aspirate. Thus λεγον, φύλο, επιστολον, κτυπωμον. The digamma was also prefixed to a broader open vowel, and always interposed between a diphthong, as ων, pronounced ωνι, ωνι; ωνινονο, ωνινονο, ωνινινι; ωνινινι, ωνινινι, ωνινινι. Now, this same digamma runs through the Gothic language, which shews that a great part of it, though from 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 ψανές, in Gothic, is written conformably to the corrupt pronunciation of ψανές, φανές, ψανές, ψανές, ψανές, (which is equivalent to ψανές) is goth. digamma, digamma, digamma; hence the English, to work.

But though the Greek may have the same form and basis 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 Roman colonies had been planted, and which was contiguous to the provinces of Greece. As the version of Ulphilas, contained in the "Codex Argenteus," is the only repository of this dialect, it is worth while to hear what Michaelis says of it in his "Remarks on the Ancient Versions," Marth's translation, vol. ii. p. 142. "In the "Codex Argenteus," many words are adopted immediately from the Greek. Here I understand, not such as have been common to the German and the Greeks from the earliest ages of antiquity, and shew either an original relation, or original connection between the two nations, but such Greek words as are found in no other German dialect than that of the "Codex Argenteus," and have been transferred from the Greek, after the complete formation of both languages: for instance, ψανε, father, am, the shoulder, a... where even the ψ is retained from the Greek termination. This betrays not a dialect that was used in Germany, or in the North, but that of a nation that lived in the neighbourhood of the Greeks. Even the mode of expressing the sound of 9g, in the "Codex Argenteus," is purely Greek, and never used in Germany, where the Latin orthography has been received; for fager is written in that manuscript fager, as the Greeks would have expressed it by a double gamma." Ulphilas is said to have invented the characters of this dialect; which are evidently a mixture of the Greek and Latin, alphabet. The use of such characters was natural, if the dialect which they expressed contained a great mixture of the languages to which they properly belonged.

This representation must greatly diminish our veneration for the Gothic, as far as it can be known by us; yet, in this light, it demands our attention and respect as the undoubted parent of the English tongue. Nevertheless, we are hence compelled to regard the Gothic and the Anglo-Saxon as hot corrupt channels by which the terms of Greece and Rome have been imported into our own language. There are, indeed, those who consider them in this humble and degraded state, as claiming the dignity of original, ancient, and independent languages. And Mr. Horne Tooke, in particular, in his celebrated work on grammar, has attempted to induce the public to receive corruptions from Greek and Latin in the dark ages, as the original words of a Northern language: whereas Greek and Latin have, according to him, themselves been derived. The merits of this question will more properly be discussed under the articles Grammar and Greek. But if the account we have given of the Gothic be just, we shall want no other evidence to convince us that the theory of Mr. Tooke, as far as this question is concerned, (and it forms a very leading feature of his system,) is not only erroneous, but ridiculous and absurd.

Goticke Metals. See METAL.

Goticke Music. When fig, Eximeno calls fugues and canons Gothic compositions, he does not disguise their structure any more than he would our cathedrals, by calling them Gothic buildings. Let fugues be banished from the theatre and private concerts, if he pleases, but let him remain in the church as a distinct species of composition, where they were first generated, and where they can never become vulgar or obnoxious. The style is naturally grave, requires musical learning, and will, by the solemnity of the words and place of performance, continue to be reverenced and respected. It is allowed that variety is more wanted in music than in any other art, and by totally excommunicating canons and fugues from the church, the art would lose one capital source of variety, as well as ingenuity; and intelligent hearers be bereaved of a solemn style of music, to be heard no where else.

Gothinli, or Gothein, in Ancient Geography, a name given to the Goths. They were called Getones by Tacitus and Julius, and Gutones by Pliny. Claudian calls them Gothani.

Gothland,
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 Nor-
way. This country is inhabited by a people, who derived
their origin from the Gete, 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, confining of pasture and arable land; and abounding
in lakes and rivers plentifully floored 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
Norcia or Nereke, and Sudermanland, on the E. by the
Baltic, on the S. by Smaland or Smålend, 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,
yre, barley, oats, peas, &c. in such abundance as to supply
the neighboring provinces. It has likewise many fine
orchards, with meadows, pastures, lakes, and rivers abounding
with fish, extensive forests, iron-mines and founderies,
and quarries of stone and marble. The inhabitants are occu-
pied in husbandry, hunting, and fishing, and also in some
places in the mines. The chief towns of this province are
Nordköping, Söderköping, Linköping, and Vadstena;
which see respectively.

South Gothland is divided into three provinces, viz.
Schenen or Skone, Halland, and Blekingen, which have at
fundenry times changed their masters, till at length Charles
Gustavus annexed them for perpetuity to the Swedish domi-
nions, by the treaty of Rödhold, in the year 1658.

West Gothland is bounded on the N. by Warmeland, on
the E. by Nerica, the Wetter lake, and Smaland, on the S.
by Smaland and Halland, and on the W. by the Scan-
garac. 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 Göteborg, Vemdonborg,
Linköping, and Falköping; which see respectively.

Gothland, or Gotland, an island belonging to Sweden,
situated in the Baltic, between N. lat. 56° 54' and 57° 50',
and E. long. 18° 6', and 19° 6'; about 70 miles long and
25 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 Stock-
holm and other places, and some curious species of stone
marbles, carnelians, agates, and beautiful petrifications.
It furnishes likewise good lime-stones, 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 arts of mechanic
trades, and navigation. The peasants are in a state of ab-
solute dependence on the burghers, who supply them with
necessaries, and with money for paying their taxes, and to
whom they surrender the whole produce of their industry,
without fluctuating any price. This island was at first sub-
ject to the crown of Sweden, and afterwards to the Danes
for near two centuries, till the year 1645, when by the
treaty of Brömberg, it was referred to Sweden. The
capital of the island is Visby, on the western coast.

GOTHS, a people, who came originally, according to
Jornandes (Rec. Get.) who abridges the Gothic history of
the learned Caesiodorus, comprised in 12 books, from the
vast island, or rather peninsula, called Scandinavia, and
including the present Sweden, Norway, Lapland, and Fin-
mark. The learned Grothus, and after him Shrapshingam,
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 Cim-
bita, Getes (see Geth), and Goths, were the fame
nation; that Scandinavia was first peopled by them; and
that from thence they detached colonies into the islands
in the Baltic, the Chenesius, and the adjacent places, yet
deficient of inhabitants. Many velliges, which cannot be
attributed 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 Ptolemey, the southern
part of Sweden seems to have continued in the posession of
the less enterprising remnant of the nation, and a large
territory even at present divided into East and West Gothland.
(See Gothland.) The time when the Goths first settled
in Scandinavia, and the period at which they first peopled
with their colonies the islands, the Chenesius, and the
neighboring places, have not been ascertained. Some have said,
that their first settlement was conducted by Eric, contempo-
rary with Sarach, grandfather of Abraham. However this
be, the peopling of the islands in the Baltic sea, of the Chenesius,
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 Tactitus) were masters
of a sufficient number of large vessels with oars; and the
distance is little more than 100 miles from Carlseron to the
nearest ports of Pomeria and Prussia. At least as early as the Christian
era, and at least as the age of the Anto-
nines, the Goths were established towards the mouth of
the V的心ba, and in that fertile province, where the commercial
centers of Thorn, Elbing, Koningenberg, and Dantzig
were long afterwards founded. Westward of the Goths, the nu-
erous tribes of the Vandals were spread along the banks of
the Oder, and the sea-coast of Pomeria 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 Vandals.) In the age of
the Antonines the Goths were still feated 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 second emigration of the Goths, from the
Baltic to the Euxine. To what cause this was owing is
matter of more 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 manly obedience which they yielded
to hereditary kings gave uncommon union and Ribility to
their councils; and the renowned Amala, the hero of that
age, and the tenth anecelor of Theodore, king of Italy,
ensured, by the descendent of personal merit, the prerogative
of his birth, which he derived from the 
anes, or demigods of the Gothic nation.

Whatever was the motive of their migration, they took
their route eastward, entered Scythia, advanced to the
Cimmerian Bosporus, and, driving out the Cimmerians, set-
tled in the neighbourhood of the Mazotic lake. Thence, in
proceeds of time, they sent out numerous colonies into Thrace,
Dacia, Media, or Italy, and laterly into the countries bor-
dering on the Euxine Sea, forcing every where the ancient
inhabitants to abandon their native abodes. Such is the
account given by Jornandes, and Abalvius, a celebrated writer
among the Goths, who lived long before him. In the vic-
nity of the Mazotic lake, they had, it is said, Filimir for
their king, who was a warlike prince; in Thrace, Media, and
Dacia, Xanokhis, a great philosopher; and in the coun-
tries on the Euxine Sea, princes of the illustrious families of
the Balbut and the Amal, the Vifigots being subject to the
former, and the Ostrogoths to the latter. In all these coun-
tries they were the same people, though subject to different
princes, and known by various appellations. As for the
denominations of Wolfergoths, fastened by the Latins into
that of Vifigots, and Oltroggoths, they were distinguished
by those names before they left Scandinavia, being called
Wolfergoths and Oltroggoths, or western and eastern Goths,
from their situation to the west and east, the former inhab-
iting that part of Scandinavia which borders on Denmark,
and the latter the more easterly 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
writers with respect to the different colonies and settlements of
the Goths. 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 incursions into the empire.

When the Goths greatly increased in Scythia, they re-
solved to seek new settlements; and accordingly, pursuing
their route eastward, and travelling through several coun-
tries, they returned at length to Germany. Their
leader in this migration was the celebrated Woden or Odin, to whom many strange things are related. It is said
by the northern writers, that he was king of the Afgar-
gians, supposing to be the same people with the Afgarians
mentioned by Ptolomy and Strabo. Afgardia and Afgar-
gia are said to be a common name of their city, situated,
according to Strabo, near the Bosporus Cimmerian; and Afgar-
gia was the metropolis of a country which Strabo calls Asia;
hence Woden and his followers are styled by the ancient
Gothic writers Afafs, Afasian, and Afate. The kings of
Afgarzia are represented as being masters of all that part of
Scythia that lay west of mount Imanas, and which the
Latins called "Scythia intra Imaum," or Scythia within
mount Imana. Of this Afgardia or Afgorgia, 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 ages, might be subdi-
vient to his purposes; when his invincible Goths, armed
with martial fanatical, should issue in numerous swarms from
the vicinity of the Polar Circle to chastise the oppressors of
man-kind. Having passed through different countries, and perform-
ed 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 ho-
nours. He is supposed to have brought with him out of
Aasia the Runic characters (see Runes), and to have taught
the northern nations the art of poetry; whence he is styled
the father of the Scalds or Sechiirs. See Scalds.

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 chron-
icles of those countries, and by many monuments and in-
scriptions 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
Scandia 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 Precop, whence, and from other collateral circum-
stances, it has been concluded that the Scandinavian and Asiatic
Scythians had one and the same original. As to the time of
this migration of Scythians under Woden into the northern
parts of Germany, those who maintain it have not been able
to determine. Some refer it to a period about 25 years B. C.;
for at that time, they say, Pompy laid waste Syria, and
great part of Asia, and menace the north with ferocity.
After all, this wonderful expedition of Woden or Odin is
admitted with great hesitation, or indeed scarcely admitted
at all by many, into authentic history. According to the
obvious sense of the Edda (see Edna), and the interpre-
tation of the most skilful critics, Afgard, instead of de-
noting a real city of the Asiatic Sarmatia, is the fictitious
appellation of the mythical abode of the gods, the Olympus
of Scandinavia; from whence the prophet was supposed to
defend, when he announced his new religion to the Gothic
nations, who were already settled in the southern parts of
Sweden.

Before we proceed with our brief abstract of the history
of the Goths, we shall give an account of their civiliza-
tions, laws, and religion, before they embraced Christianity.
With regard to their general disposition and character, they
were celebrated for their hospitality and kindness to strangers;
and it is said that they derived their name from their being
enemies to goads; the time of Goths being derived, accord-
ing to Grotius and other writers, from the German word
goten, 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 philos-
ophers. 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.

The severity, and likewise polygamy, prevailed among them,
when they were known to the Greeks and Romans only by
the name of Geats, as appears from the poet Memnon,
who was himself a Geat, and from Homer (Iliiad, 24) who
blesses great eunuchians on the virtue and chaste-
ity of their women. Of their laws we shall have occasion to
speak in the sequel of this article. Their government was mon-
cracy. Their religion seems to have been the same with
that of the ancient inhabitants of Scandia and Saxony;
which see respectively. Till the end of the eleventh century,
a celebrated temple laboured at Upsal, the most consid-
erable town of the Swedes and Goths. This temple was en-
riched with the gold which the Scandinavers had acquired
in their piratical adventures, and sanctified by the uncounted 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 suspended in the sacred grove adjacent to the temple. The only traces that now subsist of this barbaric superstition are contained in the Edda; which see. See also Osir.

Concalla was the first Roman emperor who quarrelled with the Goths, and marched against them into that part of Duænis, 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 incon siderable. 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 tributes, as soon as they heard of the assistance given to the emperor Maximin, who was of Gothic extraction, they resolved to revenge it, and accordingly entered 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 Marcianopolis, 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, Chiva, with a more considerable force; and having obliged Darius, the son of the Roman emperor, to fly himself by flight, they were opposed by the emperor himself. Darius, having compelled them to raise the siege of Nicopolis, they retired towards Philoppolis, took it by storm, and massacred, as it is said, 100,000 persons in the face 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 recruited, 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 pursued by the Roman armies; and exhausted by the long siege of Philoppolis, they could gladly have purchased, by the surrender of all their beasts of burden 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 loit; nor could the body of the emperor ever be found. Upon the election of Gallus A. D. 251, 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 peace.

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 distress, Emilianus, 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 frontiers of the ill-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 stores of the Gothic hostilities were 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 fourth of that inland sea were situated the wealthy provinces of Asia Minor, which possessed all that could attract, and nothing that could resist, a barbarian conqueror. The little kingdom of Bosphorus, whose capital was situated on the shores, through which the Maeotis communicates itself to the Euxine, was composed of degenerate Greeks, and half-civilized barbarians. In this small kingdom, domestic factions, and the fears, or interest, of obtuse usurpers, who feized 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 "Camaras," framed of timber only, without any iron, and occasionally covered with a shields roof, on the appearance of a tempell. 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 Trebizond 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 105,000 men. But this numerous garrison was disdained in riot and luxury, and thus rendered cardeles in guarding their impregnable fortifications. The Goths, availing themselves of the feeble negligence of the besieged, erected a lofty pile of fagaces, ascended the walls in the silence of the night, entered the defended city, sowed 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 mouths of the Bosphorus, the Nicker, and the Danube; and increasing their fleet by a great number of fishing harks, 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, Prusa, Apamea, Cius, and Nicomedea. From the recent attack of Prusa, the Goths advanced within 18 miles of Cyzicus; but their progress was stopped by the small river Rhynacetus, which issues from the lake Apollinates, and which was then swelled into a broad and rapid stream. Their retreat to the maritime city of Heraclea, where their fleet was probably stationed, was attended by a long train of wagons, laden with the spoils of Bithynia, and
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and was marked by the flames of Nice and Nicomedia, which they wantonly burnt. The third naval expedition of the Goths consisted of 5000 sail of transports, containing about 15,000 warriors. They now cleared their destructive course from the Chimerian 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 thence passed through the narrow passage of the Hellespont, and purloined their winding navigation amidst the numerous islands scattered over the Archipelago, or Euphrus fa. At length the Gothic fleet anchored in the port of Pireus, five miles from Athens, ravaged Greece, and caused the ravages of war, both by land and sea, to spread from the calumny point of Sunium, to the western coast of Epirus, advancing within sight of Italy. The indolent Gall emus was routed; the emperor appeared in arms; and his presence contributed to check the ardour of the enemy. Some of the numerous Gothic host broke into Macedonia, for the purpose of forcing their way over the Danube to their settlements in the Ukraine. Others returned on board their vessels, and re-tracing 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 Hermon, and refurnished 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 Niell they constructed a fleet of 2000, or even of 6000 vessels, which, in their passage through the Bosphorus, encountered various difaters. However, they made several conquests 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 Cretce and Cyprus: the main body, nevertheless, purloined 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 diffraited, 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 delivered the empire from this host of barbarians, he was distinguished by posterity under the glorious appellation of the Gothic Claudius. The decisive battle was fought near Naelius, a city of Dardania. The war was afterwards diffused over the provinces of Macedonia, Thrace, and Macedonia, and the superior talents of the emperor generally ensured the success of his arms. The Goths suffered to such a degree, that a select body of their youth was received among the Imperial troops, the remainder was fold into servitude, and the female captives were so numerous, 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 rear was thus intercepted. Aurelian, the successor of Claudius, distinguished himself during the Gothic war, and, at last, put an end to it by a lasting and beneficial treaty. The Goths were engaged to supply the armies of Rome with a body of 2000 auxiliaries, confining entirely of cavalry, and, in return, permitted 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 seemed as the foremost barrier of the empire against the invasions of the foes from the North.

About the year 273, the second of the reign of Procopius, the Goths entered Thrace, and advanced as far as Illyricum, laying waste 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, Procopius 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 "Sarminianus," as appears from several ancient coins and inscriptions. From this year to the 15th of Constantine, 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 Campana, in Pannonia, and at Margus and Borea, in Upper Media. The emperor determined to chastise as well as to repulse the indolent barbarians who had dared to attack the territories of Rome, pulled the Danube, and penetrated into the inmost recesses of Dacia; and when he had inflicted a few reverses, 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 40,000 soldiers. In the year 331, a war broke out between the Goths and Sarmatians; on which occasion the latter had recourse to Constatine, who was glad to embrace an opportunity of humbling that ferocious nation. In the first act the barbarians gained the advantage; but the event of a second and more successful action, in April 332, 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 great, as to oblige Alaric, 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 Constahtine, Julian, Trajan, and Valentinian I. But in the first of Valens, they made inroads into Thrace, and laid waste 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 deplored 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 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 appeared the redemtment of Valens. After the ratification of the treaty, Valens returned in triumph to Constatine, and offered the empire in return for his services.
flamnplex, and the Goths remained in a state of tranquillity 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 373, the Huns invaded the territories of the Goths, and spread among them such a general consternation, that they fled for refuge to the Roman dominions. Valens listened to their supplications, and granted them protection. The liberty of the emperor, however, was accompanied with too hard 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 force as hostages to secure the fidelity of their parents. A probably true statement 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 sum 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, joyfully availed at the cruel treatment they met with from the Roman officers, who were to supply them with provisions, had fearely 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, Thaffara, and other saxons 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 invasion rolled from the walls of this city to the coasts of Constanctinople; and the Roman provinces were ravaged by the barbarians. At this time a suspicion prevailed, that the Goths of Asia had formed a secret and dangerous conspiracy against the public safety. An order was promulgated that, on a flated 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 pleasing hope allayed the fury of their resentment, and perhaps fulfilled 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 Moesia, 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 Visigoths was settled in Thrace; the remains of the Ostrogoths 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 polished, and that their politeness would be infinitely 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 impatient 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 interruption, or at least the diminution, of the fidelity to which the Goths had received from the prudent liberality of Theodosius, was the natural result of their recent defeat. Instead of being impelled by the blind and headstrong passions of their chiefs, they were now directed by the bold and ardent genius of Alaric. In the year 396 Alaric marches into Greece; and he halted to occupy the city of Athens, and the important harbour of the Piraeus. Corinth, Argos, and Sparta yielded without resistance to the arms of the Goths. From Thermopylae to Sparta, the leader of the Goths pursued his victorious march, without encountering any mortal antagonists; and the Christian faith, which he had devoutly embraced, taught him to despise the imaginary delights 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 Phocas, near the fources of the Peneus, and on the frontiers of Elis; 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 magnates of Constantinople; 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 Illyrians; and the chief among them, and his new command distinguishes the firm and judicious character of his policy. He issues his orders to the four magazines of offensive and defensive arms, Margus, Ratiaria, Maifus, and Thefalonica, 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 Visigoths. Thus armed with all his power, and seated on the verge of the two empires, he annexed 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 loses 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 Thefalonica, through the warlike and hostile country of Pamnonia, as far as the foot of the Julian Alps; his passage of those mountains, which were strongly guarded by troops and entrenchedments; the siege of Aquila, and the conquest of the provinces of Illyria and Veneti, appear to have employed a considerable time. In the year 402, Alaric, to prevent his army from encamped at Placentia, on the Tanaro, in Piedmont. While the
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Christian Goths were devoutly celebrating Easter, they were attacked by Silicho, 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 possessed a mind, that was invincible and superior to misfortune, and that derived new resources from adversity. The Gothic sovereign, willing to distinguish his retreat by some illustrious exploit, attacked Venetum, but the battle that ensued he suffered a defeat, and he retired. In the year 408, Alaric marched again towards Rome; with bold and rapid marches he passed the Alps and the Po; hastily pillaged the cities of Aquila, Altinum, Concordia, and Cremona; increased his forces by the accession of 50,000 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 renown having been offered and accepted, he raised the siege. A.D. 409. Alaric's next attack was directed against the part of Olla, 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 supererogating Honorius, and lowering the purple on Ataullus, prefect of the city. Ataullus 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 Salarian 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 faltered and civilized to considerable a 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 Infantry of Italy, 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 Atanplius, or Adolphus, who concluded a peace with the empire, and marched into Gaul A.D. 412. Being driven out of Gaul A.D. 415, he retired to Spain, where he was soon after assassinated. 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 formidable, but successful war with the barbarians, who had settled in Spain. His victorious Goths, A.D. 419, forty-three years after they had passed the Danube, were enfranchised, according to the law of treaties, in the possession of the Second Aquitania, 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 Thoulou. Thus, about the same time, in the left year of the reign of Honorius, the Goths, the Burgundians, and the Franks, obtained a permanent seat and dominion in the provinces of Gaul. Vaila was likewise 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 at 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 afford them against the Huns, who had entered Gaul. Thorifumund, his son and successor, breaks with the Romans; but his brother Theodor, who next occupied the Gothic throne, and who was incessantly 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 Rigild, 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 Ermig, who attended the throne A.D. 460, 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 for their king. His son, theodoric, governed them by his lieutenants. Ermig, having also made himself master of the best part of Gaul, comprising the whole tract between the Rhone and the Loire, and of the greater part of Spain, was still desirous of reducing the remaining parts of both countries, when his death at Aries, A.D. 484, put an end to his great designs. Ermig is said to have been the first who gave written laws to the Goths, for till his reign they had been governed by custom only; and for this purpose he employed Leo, his prime minister, one of the most learned men, and best counsellors of that period. These laws were called the "Theodoric's laws"; and were obtained by Ermig upon the people of Gaul and Spain, who had 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 kingdom of the Vifgots in Gaul terminated; and they, being driven from thence, fixed their royal seat at Toledo, in Spain. (See VIFGOTS.) For the history of the Ostrogoths; see OSTROGOCTS. Under Theodoric, who A.D. 484, caused himself to be proclaimed by his Goths king of Italy, he was acknowledged as such by the emperor Zeno, and Theodoric secured his new kingdom by alliances with neighbouring powers; he quartered all his Goths in the civitates 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 the polity 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 TURONS.
Goths, who besieged it A.D. 537, and continued it above a year till their final departure. During this siege, which was carried on 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. Wittigis, their king, retired for shelter within the walls and morasses of Ravenna. At length Belisarius besieged the city, and took it in the latter end of the year 539. The submision of the capital was capitulated 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 subfittute of Julianus, their oath of allegiance. In the year 540, the Goths revolted, and Totila, the nephew of their late king, undertook the restoration 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 harve 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 thrice repulsed; they lost the flower of their troops, and the royal standard was almost fallen into the hands of the enemy, and the face of Totila sunk, as it had risen, with the fortune of his arms. Rome was again taken by the Goths, A.D. 549. Julianus made great preparations for the Gothic war, the conduct of which was committed to Narsetes, who defeated Totila in a bloody engagement, July, A.D. 552, and Totila himself was struck through the body with a lance. Narsetes then proceeded to the conquest of Rome; and Julianus 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 diligent 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 60 years, the throne of the Gothic kings was filled by the exarchs of Ravenna (see EXARCH); and the remains of the Gothic nation evacuated the country or mingled with the people. (Ancl. Un. Hist. vol. xvii. Gibbon's Hist. vol. viii. palfim.)

The Goths spread themselves very widely in their various associations, and formed part of the population of the several nations of Europe. In England the Celtic population was succeeded by the Goths, and about two-thirds of England were peopled by the Belgic Goths. (See BELGIAC and ENGLAND.) About the time that the Belge feized on the fourh 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 Belge, feized on a third part of the country into which they introduced the Gothic language and manners. (See BELGIAC and GAUL.) The original population of the Netherlands was Celtic; but it was afterwards supplantated by the Belge. (See BELGIAC and NETHERLANDS.) In Germany, the Scythians or Goths, proceeding either from Scandinavia, or, as others say, from their original seat on the Oxus, expelled the Cimbri and Fins, and the, 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 Pucini and Adili, Gothic tribes bordering on the Venedi, who were Slavonians. (See PRUSSIA.) The Vandals, who conquered Spain in the fifth century, were fabulated 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 Enixine, 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 Alcyrians from the south. (See Turkey.) The Batavi of Holland were the most northern people of Belgic Gaul, and without doubt a German or Gothic progeny. (See BATAVI, GAUL and HOLLAND.) 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 nation; 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 Helveticans, or original Swiss, 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, firmly maintained by Claudian and Polland, and adopted by Mallet in his "Northern Antiquities," that the Gothic and Celtic nations were the same; but the ingenious English translator of M. 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 persons, manners, laws, religion, and language. The former were the ancestors of the Gauls, Britons, and Irish; and the Germans, Saxons, and Scandinavians derived their origin from the latter. The Celtic tribes were probably the first that travelled westward; and the Goths, or Goths 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 descended 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 these 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 polycem of polytheism which was afterwards delivered in the Eda; 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 same 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.

GOTLANDA, in Geography, a town of Sweden, in Norcia; nine miles N. E. of Orebro.

GOTOMB, a town of Poland, in the province of Lublin; 28 miles N.W. of Lublin.

GOTON, a town of Gbisa, in the province of Soesthauen; 48 miles N. W. of Osnam.
GOTSEELA, a town of Bengal; 48 miles W. of Midnapour.

GOTTA, or Gotto Islands, a cluster of small Japanese islands. N. lat. 30° 40'. E. long. 131° 40'.

GOTTAUL, a town of Bengal; 33 miles S. of Burdwan. N. lat. 22° 44'. E. long. 88° 5'.

GOTTESBERG, a town of Slesvig, in the principality of Schleswig-Holstein, near which are two rivers, 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 Schleswig. N. lat. 50° 35'. E. long. 15° 54'.

GOTTESGAB, a town of Bohemia, in the circle of Saaz. N. lat. 50° 22'. E. long. 12° 54'.

GOTTI, Vincent-Lewis, in Biography, was born at Bologna in the year 1664. At nineteen years of age he embraced the clerical life among the Dominican monks, and when he had completed his course of philosophy at Bologna, he was sent to study theology for four years at Salamanca in Spain. Upon his return to Italy in 1689, he was appointed professor of philosophy in the university of Bologna; and soon recommended himself by his talents and virtues to the pupils 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 70th 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 Chrilli Ecclasia," in three volumes; "Theologia Scholastico-dogmatica, quae Mentem div. Thomae Aquinatis, &c." in six volumes. 4to.; "Colloquium Theologicae-polemicae, in tres clades distribuito, &c." 4to.; "De Eligenda inter Diffidentes Christiano Sententia," written in answer to a piece with the same title, by the celebrated John le Clerc; and an elaborate work in defence of the truth of the Christian religion against Atheists, Idolaters, Mahometans, Jews, &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-Francis, was born at Brussels in the year 1630, and entered into the order of the Jésuites at Mechlin in 1655, 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 considerate mathematician: a great lover of pure geometry, and had a dislike to the algebraic method of resolving problems; his works are very numerous, and have been highly recommended for perspicuity and precision. They relate to arithmetic and geometry; to the various parts of astronomy, and other branches of speculative and practical mathematics. Moreri.

GOTTINGEN, or Göttingen, in Geography, a town of the kingdom of Westphalia, 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 Marisch. The number of houses is about 1000, containing about 8000 persons; the streets are large and paved; it has five parish churches, and one for Calvinites; 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 fynod chosen by the regency, assisted 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 visitation of its first curator, Baron Munchhausen, it has risen to distinguished reputation. It has a splendid church, with its own pastor; and it is accommodated with a lately 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 "Bibliothek," from a collection of about 100,000 volumes, with which it originated, bequeathed by Baron Bubow 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 physical garden, anatomical theatre, &c. The territory belonging to the town is very considerable; 22 miles N. E. of Celle. N. lat. 51° 51'. E. long. 9° 52'.

GOTTO, a country of Africa, situated to the south of Juba and Tombutteo, and the river Niger or Joliha, about 15° N. lat., and from 0 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 Moufleidou, from the name of its first monarch.

GOTTOLENGO, a town of Italy, in the department of the Moda; 15 miles S. of Brescia.

GOTTORP. See Sleswig.

GOTTSCHIE, a town of Middle Carniola; 20 miles S.S.E. of Ljubljana. N. lat. 45° 53'. E. long. 14° 48'.

GOTZEL, a town of Bavaria; 36 miles E. of Ratiboh.

GOVAN, a town of Scotland, in Lanarkshire; the population of which, in 1801, was 6701, of which 1314 were employed in trade and manufactures; four miles W. of Glasgow.

GOUANDORE, a bay on the coast of Chili.

GOUANIA, in Botany, was named by Jacquin in honour of Anthony Gouan, a physician and celebrated botanist of Montpellier, where he has long filled the botanical chair, 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 Montpeliensis, arranged according to what he himself calls a hybrid syllabus, the outlines being on the principles of Tournefort, the subordinate sections taken from the Linnaean system. The work appeared in 1765. He had previously, in 1762, published a Hortus Montpeliensis according to the last-mentioned syllabus. Each work forms an octavo volume. They are chiefly remarkable for the secondary generic characters, taken from the habit, subjoined to the collateral ones which are founded on the fructification. Professor Gouan published also a folio volume of Observations Botaniques, with plates, illustrative of the plants of his neighbourhood; as well as a quarto in Latin and French on the methodical arrangement, and generic characters at length of flowers.—Ibid. Amer. 263. Linn. Gen. 545. Schreb. 33. Mart. Mill. Ditt. 2. Jull. 381. Linn. Rhamni, Nov. 845.—Chief of order, Polyantha Moutzela, or rather Pterostylis Moutzela, Nov. Ord. Dainii, Linn. Rhamni, Nov.

Gen. Ch. Cal. Perianth of one leaf, superior, 5-angled, setaceous, obtuse at the summit, spreading, deciduous. Cor. Petal 5, 5-foil to the filaments, hood-shaped, clavate. Stam. Filaments 5, awl-shaped, the length of the stigmas, a little, and alternate with them, inserted into the tube; anthers roundish, incumbent, sheltered by the petals. Pyl. Ger- men inferior, roundish; style awl-shaped, divided half-way down.
down into three segments; stigmas obtuse. *Peris.* Capsule with three angles, separable into three parts, of one cell each, not burbling. *Seco* solitary, ovate, compressed, polished.—There are some male flowers, furnished with a style, but destitute of germen and stigma.


Jacquin originally described two species, of which Linnaeus adopted but one. Lamarrack has added three more, all in our possession, to which we are enabled to furnish three non-descript species, making eight in all.

1. *G. dominifera.* Lam. Sp. Pl. 1653. Lamarck Dict. v. 3, 4. (G. glabra; Jacq. Amer. 264. t. 158. f. 49. Lupinus fyllodis americana, &c. Pluk. t. 207. f. 4.)—Leaves ovate, pointed, serrated, nearly smooth. Wings of the fruit dilated, kidney-shaped.—Native of woods in Hispaniola and the Bahama islands. A climbing much branched shrub, the young branches downy, ending in long simple spiral tendrils. Leaves alternate, on short hairy stalks, ovate, a little unequal, an inch and half long, bluntly serrated, furnished with a blunt entire point, and with several straight parallel veins directed forward. The young leaves are rather downy, old ones nearly smooth. *Stipulas* small, half arrow-shaped. Flowers in long terminal clusters, small, greenish and unornamental. *Capsules* of a light spongy texture, their central part as big as a small pen, the wings three to six, long, spreading, pale brown, smooth and somewhat polished. *Seco* hard, of a brownish brown.

2. *G. tomentosa.* Jacq. Amer. 253. Lam. Sp. Pl. (G. crenata; Lamarck Dict. v. 3, 5) "—Leaves ovate, crenate, 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. *Seco* black and shining. Lamarrack supposes his plant to be the fame on account of the great size of its leaves, and he says it is distinguished from all others by its crenature. Jacquin describes his as slightly crenate.

3. *G. cylindrica.*—Leaves elliptic-oblong, pointed, obtusely serrated, roughly, naked on both sides. Wings of the fruit brown, orbicular.—Native, we believe, of the West Indies. The very young shoots and leaves only are silky and serrigenous. The full-grown leaves are near three inches long and one broad, somewhat ovate, either almost entire, or furnished with shallow distant serratures, and a short entire blunt point; they are green and quite naked on both sides, but hairy to the touch on the upper surface. Veins distinct. Faworks, flower-skulls, and *Stipulas* hairy. *Flowers* somewhat silky. Fruit orbicular at each side, each wing forming a hemisphere, and not being much dilated.

4. *G. denticulata.*—Leaves ovate, pale and downy beneath, entire, with a finely-toothed point.—Gathered by the late Mr. Christopher Smith in the island of Hominois, East Indies. The leaves are about an inch and half long, with straight veins, connected by numerous minute rectifications, 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 side is rough to the touch, but green and naked; while the lower is hoary with very dense short fly, the veins only being naked. *Stipulas* small and deciduous. A simple curled *tendril* terminates each lateral branch, as in all the foregoing. *Flowers* in axillary downy clusters, with lanceolate deciduous bracteas. The fruit we have not seen.

5. *G. murrayana.* Lamarck Dict. v. 35.—Leaves ovate, pointed, variously serrated, downy on both sides.—Native of the heights called the Goi, in the desert, of the isle de Bourbon, where it was gathered by Commerfon, and sent to the botanic garden at Paris. The leaves are the size of the last, but green and clothed with silky down on both sides. Their figure is ovate, rarely somewhat cordate, often unequal, sharp-pointed, their marginingularly variable, being sometimes nearly entire, having only feinted shallow serratures, sometimes very deeply and doubly serrated, not unlike the Roman nettle, *Urtica pilulifera.* *Stipulas* ovate, acute, clothed with shining reddish silky hairs, as well as the young twigs and tendrils. The fruitification is wanting in our species. Lamarrack says the *Capsules* have rounded thin and membranous wings.

6. *G. filifolia.* Lamarck Dict. v. 3, 5. (G. Stadtmannii; Willem. Herb. Maurit. 83.)—Leaves heart-shaped, bluntly pointed, smooth on both sides, bluntly and slightly serrated. Native of the ile de Bourbon, near la Pliibagne. Commerfon. The stem is much branched and diversified, smooth, except the very young shoots. Leaves an inch or inch and half long, and nearly as broad, heart-shaped, with shallow serratures and a short blunt point. They are light green and naked on both sides; the young leaves very minutely chagrined beneath. *Stipulas* glandular. Flower-skulls rusty and downy. The tendrils become very thick and strong by age.

7. *G. integrifolia.* Lamarck Dict. v. 3, 5. —Leaves ovate, bluntly, entire, smooth on both sides. *Stipulas* awl-shaped. Long cultivated in the Paris garden, but its native country is not reknown. We have a specimen from thence, definite of flowers and fruit, yet we readily agree with Lamarrack that there can be no doubt respecting its genus. The habit, stem, tendrils, folded young leaves, and their pale parallel veins, all indicate a *Goua*, 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 midrib sometimes slightly hairy at the back. *Stipulas* awl-shaped, deciduous. Flower-skulls hairy only while young.

8. *G. finifolins.—Leaves heart-shaped, minutely serrated, acute, somewhat hairy. *Stipulas* awl-shaped. Flower-skulls umbellated, scarcely so long as the leaves. Brought by the late Sir G. L. Staunton, Bart. we believe from the Draufs. 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; rusty and hairy, like the flower-skulls and calyx. 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. 8.

GOUAREC, in Geography, a town of France, in the department of the North Coasts, and chief place of a canton, in the district of Louvain; 24 miles S.W. of St. Brieuc. The place contains 678, and the canton 6,293 inhabitants, on a territory of 203½ Kilometres, in 5 communes.

GOUD, or GAUD. See WELD.

GOUDA, or THE KOELW, in Geography, a city of Holland, seated on a branch of the Rhine, called IJssel, 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 glas windows, which were executed principally by Theodore and Walter Crabeth of this town, and which are carefully preserved. The town is advantageous situated, on account of the sluices and canals, which are running screaming, and its convenient port on the IJssel. It has five gates, and is so circumstanced by reason of the sluices, which may imitate the current of the adjacent country, the breadth and depth of its ditches, and
and the strong fortifications on the banks of the Iffel, 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° 8'. E. long. 4° 36'.

GOUDHURST, a post-town of England, in the county of Kent, containing 1752 inhabitants; 11 miles S. of Maidstone, and 44 S.E. of London.

GOUDOZ, a town of Afiatic Turkey, in Natolia; 72 miles E.N.E. of Kuitaja.

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 left his life at Lyons, on the day of the massacre of Paris, for having met to music 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 Genoa, and by the Catholics in Italy for introducing 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 fear 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 1567, 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 not for note, the most ignorant in music, if pleased of a voice, and acquainted with the psalm-tone, 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 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 "Liber quartus Ecclesiastico-Romanum quater quattuor vocab vocum Motetx vocant," printed at Antwerp, by Sufato, 1554, eighteen years before his death. On forswearing 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 Draudus, Bibl. Class. et Bibl. Exot. (See FANCI, CLAUDE LE JEUNE, and PALESTRINA.) The motets of Goudimel, in four parts, remind us of gravity of style, simplicity in the subjects of fugue, and purity of harmony, the ecclesiastical compositions of our venerable countryman Bird.

GOODSWAARTE, in Geography, a small island at the mouth of the Meuse, S. of the island of Putten.

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 Hindostan, in Masulipatam; 10 miles E. S. E. of Dig.-Also, a town in Oude, near the De- wash; 20 miles N. of Azimugur.

GOVERDUNPOUR, a town of Hindostan; 44 miles N. of Allahabad.

GOVERNMENT, a town or place which has no man power or right to command or rule over a place, city, county, or kingdom, or the like, either supreme or by deputation.

Government is either general and supreme, as that of a whole kingdom, empire, sovereign state, &c of 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-councilmen.

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 restraints, or governs by fixed and established laws; whereas, if this single person lie 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 an oligarchy, or aristocracy; and if all the citizens have an equal voice in making laws, and appointing magistrates, or the supreme power be lodged in the whole body of the people, it is called a democracy or republic. See the 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 subsist, actually begun, there is and must be in all of them a supreme, irremovable, absolute, uncontroverted government, 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. iv. ... optimam con-

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The subject of the patriarchical chief, or favorer by any previous division of ancestry, would enable the person who posseffed it to acquire the almost absolute division of the affairs of the community; more especially if he took care to associate to himself proper 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 station 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 preserve 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, fays 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 these countries were occupied by many small independent nations, resembling those which are now found among the savage inhabitants of North America, and beyond 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 monarchal.

Our readers will observe that this theory is very different from Sir Robert Filmer's patriarchal scheme, now, indeed, almost forgotten and fearfully deserving to be recorded, the refutation of which constitutes the first part of the admirable Locke's 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 exercice 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 fitful to refild government, as is evident from his letter to lord Ruffell. 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. Pakey, 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 distributes 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 prescriptive title, in hereditary monarchies, is corrodorated, and its influence considerably augmented, by an acception of religious sentiments, and by that

Another source of personal authority, which might extend, or supercede, 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 advantage, added to the authority of the patriarchal chief, or favored by any previous division of ancestry, would enable the person who possessed it to acquire the almost absolute division of the affairs of the community; more especially if he took care to associate to himself proper auxiliaries, and to gratify or remove those who opposed his pretensions.
GOVERNMENT.

Sacredness which men are apt to ascribe to the persons of princes. 2. Those who obey from reason, by a consideration of the necessity of some government or other, and of the certain mischief of civil commotions. 3. Those who obey from self-interest, and who are kept in order by a variety of considerations that immediately affect themselves.

Concerning the moral obligation of submission to civil government, those 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, resolves the duty of submission into the universal obligation of fidelity in the performance of promises. This compact is either, 1. Express, on the part of the primitive founders of the state, who are supposed to have met together for the declared purpose of settling the terms of their political union, and a future constitution of government. The whole body is supposed to have unanimously consented to be bound by the resolutions of the majority; and that majority is supposed to have fixed certain fundamental regulations, and thus to have constituted, either in one person, or in an assembly, a standing legislature, to which, under these pre-established restrictions, the government of the state was thenceforward committed, and whose laws, the several members of the convention were, by their first undertaking, thus personally engaged to obey.—This transaction is sometimes called the "Social compact," and these sup- posed original regulations compose what are meant by the "constitution," the "fundamental laws of the constitution," and form, on one side, the "inherent indefeasible prerogative of the crown," and, on the other, the unalienable "birthright" of the subject; i.e. a tacit or implied compact by all succeeding members of the state, who, by accepting its protection, consent to be bound by its laws. "This account of the subject," says Dr. Paley, "although specious, and patronized by names the most respectable, appears to labour under the following objections; that it is founded upon a supposition false in fact; and leading to dangerous consequences." No such social compact was ever really made, nor any such original convention of the people ever actually held, or could be held in any country, antecedent to the existence of civil government in that country. It is to suppose it possible to call savages out of caves and deserts, to deliberate and vote upon topics, which the experience, and studious arrangements of civil life alone suggest; therefore no government in the universe began from this original. At a Revolution some imitation of a social compact may have taken place. The establishment of the United States of North America bears the nearest resemblance of it. Should it be said, that the original compact is not proposed as a fact, but as a fiction, for the commodious explication of the mutual rights and duties of sovereigns and subjects; to this representation 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 magistrates, nor afford any foundation to rights, which are supposed to be real and existing. But in the books, and also in the apprehension of those who deduce our civil rights and obligations à patris, the original convention is appealed to, and treated of, as a reality.

Moreover, it is alleged, that the theory of government, which affirms the existence and the obligation of a social compact, leads to conclusions unfavourable to the improvement, and to the peace, of human society. Upon this theory it may be presumed that many points, called "fundamentals" of the constitution, were settled by a convention of the people, anterior to the establishment of the fulfilling legislature, and which the legislature has no right to alter, or interfere with. This circumstance affords a dangerous pretence for disputing the authority of the laws. Hence arose the doubt, which so much agitated the minds of men in the reign of Charles II, whether an act of parliament could of right alter or limit the succession 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 established, however absurd or inconvenient it may be. Moreover, every violation of the compact on the part of the governor releases the subject from his allegiance, and dissolves the government.

Dr. Paley, rejecting the intervention of a compact, as unfounded in its principle, and dangerous in the application, assigns for the only ground of the subject'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 society conduces to that end; civil societies cannot be upheld, unless in each, the interest of the whole society be binding upon every part and member of it; and this step of the argument conducts us to the conclusion, namely, that so long as the interest of the whole society requires it, that is, so long as the established government cannot be refilled or changed without public inconvenience, it is the will of God (which will universally determines our duty) that the established government be obeyed; and no longer. This principle being admitted, the justice of every particular case of resistance is reduced to a computation of the quantity of the danger and grievance on the one side, and of the probability and expense of redressing it on the other. If it be asked, who shall judge of this? the answer is, "Every man for himself." In contentions between the sovereign and the subject, the parties acknowledge no common arbitrator; and it would be absurd to refer the decision to those whose conduct has provoked the question, and whole own interest, authority, and fate, are immediately concerned in it. From the substitution of "public expediency" into the place of all implied compacts, promises, or conventions whatsoever, our author infers, 1. That it may be as much a duty at one time to resist government as to obey it. 2. That the lawfulness of resistance, or the lawfulness of a revolt, does not depend alone upon the grievance which is sustained or found, but also upon the probable expense and event of the contest. Hence those who concerted the revolution in England were justifiable in their counsels. 3. That irregularity in the first foundation of a state, or subsequent violence, fraud, or injustice in getting possession of the supreme power, are not sufficient reasons for resistance, after the government is once peaceably settled. 4. That resistance is not justified by every invasion of the subject's rights, or liberty, or of the constitution; by every breach of promise, or of oath; by every stroke of prerogative, abuse of power, or neglect of duty on the part of the chief magistrate; unless these crimes draw after them public conceptions of sufficient magnitude to outweigh the evils of civil disturbance. 5. That no usage, law, or authority whatever, is so binding, that it need or ought to be continued, when it may be changed with advantage to the community. 6. As all civil obligation is resolved into expediency, what, it may be asked, is the difference between the obligation of an Englishman and a Frenchman, or why is a Frenchman bound in conscience to bear any thing from his king, which an Englishman would... 582
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 inquired, can this comparision 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 conscience bound to endure many things from his prince, to which an Englishman would not be bound to submit for the following reasons; vis. 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 facial 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, it extends to 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 conscience at all, and how far, and to what caffes, 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 right (however they might give way to necessity) from the authority of the Roman sovereign, we are furnished with a still more apt 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, “whosoever refuseth the power, refuseth the ordinance of God.” This phrase, “the ordinance of God,” is by many so interpreted as to authorize the most exalted and superstitious ideas of the regal character. But surely such interpreters have facriYiced 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 is 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 constituencies, 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 decree, by which he afflicts, 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 “ordination of men.” Paley, ubi supra. See King, Law, Liberty, Monarchy, Parliament, Passive obedience, &c.

Government, in Grammar, is understood of that con- struction 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 concord, and that of government, called also regimen. See Concord and Regimen.

GOVERNOLO, in Geography, a town of Italy, in the department of the Mincio; 12 miles S. E. of Mantua.

GOVERNOR, an officer vested 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 superintendent.

Thus we say, the governor of the bank; the governor and directors of the South Sea company; the governor of an hospital, &c.

GOVERY, in Geography, a town of Hindooalan, in the circar of Rajamundry; 10 miles W. N. W. of Rajamundry.

GOUF. See Golf.

GOUFRE, in Geography, a town of Canada, in the river St. Lawrence; 50 miles E. of Quebec.

GOUGAN-BANIA, a lake of Ireland, in the county of Cork, not far from Inchigeele. 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.

GOUGE, William, in Biography, who flourished in the former part of the seventeenth century, was born in the parish of Baw, 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 pastoral 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 appropriations, to bestow them on such unpatronized clergymen as were distinguished for piety and other ministerial qualifications, which occasioned his being prosecuted in the Star-Chamber. In 1653, 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
GOU

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 78th year. He had, for several years, been esteemed the father of the London ministers. In his department, 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 Baw, in the year 1655; and having, in his academical course, followed the steps of his father, he was first chosen fellow of his college, and afterwards presented with a living at Colden, near Croydon, in Surrey, where he continued but a short time; and, in 1658, 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 station with much merit, and was frequently invited to preach 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 shrine 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 successful applicant to 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 outlay of the buildings. By degrees these schools amounted to between three and four hundred, and they were all annually visited by Mr. Gouge, who hospitably escorted 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 professions carried on against him in the ecclesiastical courts. With the assistance of his friends, whose parishes were ever open at his command, he printed eight thousand copies of the bible in the Welsh language, a thousand of these 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 pay 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 Christ's Hospital, where he catechized and instructed the children in the fundamental principles of religion. He died suddenly in 1691, 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 eulogy on his piety and virtue, observes, that "all things considered, there have not, since the primitive times of Christianitv, been many among the sons of men, to whom that glorious character of the son of God might be better applied, that "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 forever, speak one word to his honour, or name any fault that they charged on his life or doctrine; no, not the partizans themselves, save only that he conformed not to their impositions; and that he did so much good with so much industry." This eminent Christian divine published a few practical pieces, of which the following are mentioned; "The Principles of Religion Explained;" "A Word to Sinners;" "Christian Directions to walk with God;" "The framed and jafele Way of Thriving, &c. by Charity to the Poor;" "The Young Man's Guide through the Wilderness of this World." Gen. Binq. Neal's Hist. of the Puritans.

GOUGEON, John, in Biography, a French sculptor and architect in the reigns 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 statue of the bailiff des Cent-Suifles, at the Louvre, enriched with sculptures, and supported by four gigantic Caryatides. He was an able medalist, and struck several pieces for Catharine de Medicis, which are sought 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, 1572. Gen. Binq.

GOUGH'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 Perouse to ascertain its true position, as it lies in the way of ships going directly to India, or China, early in the leasom, without touching at the Cape.

GOUJET, Claude Peter, in Biography, was born at Paris in 1607. His father, a tailor by trade, in vain opposed his inclination for a ludicrous life. He was educated among the Jesuits, and, having taken orders, became a canon of the church of St. Jacques de 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 1757, 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
two volumes. 4to. "Supplement to Morey's Dictionary," two vols. folio. "Bibliotheca des Ecrivains Ecclésiastiques," three vols. 8vo. "Difcours sur le Renouvellement des Études depuis le xiv siècle." "De l'État des Sciences en France depuis la Mort de Charlemagne jusqu'à celle du Roi Robert." This disfertation obtained for the author the prize of the Academy of Belles Lettres, and he was complimented by a deputation from that body, defering permission to nominate him to the vacant place of the deceased abbé Vertot. Goujet was likewise author of "Bibliothèque Française, ou Histoire de la Littérature Française," 18 volumes 12mo. which is reckoned his most valuable work. Moreri.

GOUVIN, in Geography, a town of Portugal, in the province of Beira; 12 miles S.W. of St. João de Pefquera.

GOVINPOUR, a town of Hindooftan, in Balcar; 26 miles S. of Balcar.—Allo, a town of Bengol; 10 miles W. of Nudinga.

GOULAMCONDRA, a town of Hindooftan, in the Myr-fore, 9 miles S. of Gooty.

GOULART, Simon, in Biography, a French Protestant divine, was born at Senlis in 1542. 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 of 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 busines of a commentator. Among these were the "Works of Plutarch;" "St. Cyprian's Works;" "Seneca's Works," &c. He made a collection of "Remarkable Histories" in 2 vols. 8vo., 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 fix vols. 4to. Many of his pieces were anonymous, but to these he usually affixed the initials S. G. S. signifying "Simon Goulart Senlifien." 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 II. of France, being desirous of knowing who was the author of a piece published under the affixed initials of Stephanus Junius Brutus, and intended to propagate republican doctrines, sent a perfon to Geneva to inquire into the matter of Goulart, but the latter refused to communicate the fact, for fear of exposing the author to ferous injury. Moreri. Bayle.

GOULDSBOROUGH HARBOUR, in Geography, a harbour of the United States of America, in the district of Main. N. lat. 44° 25'. W. long. 67° 53'.

GOULERGAUFT, a town of Thibet; 28 miles S. of Deprag.

GOULOUR, a town of Hindooftan, in the circuit of Sanore; 18 miles N. of Sanore.

GOULSTON, Theodore, in Biography, was the father of William, rector of Wymondham, and was born in Northamptonshire. He became probationer fellow of Merton college, Oxford, in 1556; and, after applying himself to the study of physic in this university, he practiced for a time with considerable reputation at Wymondham and its neighborhood. At length, after taking his doctor's degree in 1610, he removed to London, and became a fellow of the College of Physicians, and afterwards censor. He resided in the parih 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 1632; and by an article in his will testified such regard to the interests of medicine, as entitled 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 four youngest doctors of the College. The public has been indebted on several occasions to this institution for ingenious disfertations, delivered as Gulianian Lectures; as those of Dr. Mufgrave; 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 Saratik. N. lat. 16° 16'. W. long. 11° 52'.

GOUNDA, a town of Hindooftan, in Oude; 32 miles E.N.E. of Manickpaur.

GOUPIA, in Botany. See Glossoptalum.

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 professorhip of medicine in the royal college, in 1555, a vacancy being occasioned by the death of Sylvius. He is principally known as an editor and annotator of the writings of Dioscorides, Alexander Trallian, Acurius, and some other Greek writers: and he was engaged in the same labour, in respect to some of the writings of Hippocrates, when his studies were terminated by death, in 1568. Eloy.

GOUR, called allo Lucknowi, in Geography, the ancient capital of Bengal, supposed to be the "Gangia Regia" of Ptolemy, which float on the left bank of the Ganges, about 25 miles below Rajennal. N. lat. 24° 53'. E. long. 88° 14'. It was the capital of Bengal 730 years B.C. and was repaired and beautified by Aschur, A. D. 1575, who gave it the name of "Lemmteabad," which name part of the circur in which it was situated fell bears. It was defeoted, as it is said, on account of the infulature 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 habitation of tygers and other beats of prey, or become arable land, whose foil is chiefly compos'd of brick-dust. The principal ruins are a moque 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 merchandize, are of a peculiarly solid and durable texture.

GOURA, or GURA, a town of the dychy of Warfaw, on the Wullala: 12 miles from Warfaw.

GOVRA, a town of Persia, in the province of Irak; 35 miles E. of Iphahan.

GOURAY, a cape on the E. coast of the island of Jersey; 4 miles E. of St. Heller.—Allo, a town of France, in
GOURGON, a town of Hindooftan, in Allahabad; 10 miles N. of Corah.

GOURGOUTY, a town of Hindooftan, in Goconda; 36 miles W. S. W. of Rochore.

GOURIN, a town of France, in the department of the Morbilian, and chief place of a canton, in the district of Pontivy; 26 miles W. N. W. of Pontivy. The place contains 3,754, and the canton 11,819 inhabitants, on a territory of 242.5 kilometres, in five communes.

GOURMA, a town of Abyflinia, on the coast of the Red Sea. N. lat. 14° 52'.

GOURMUNGUL, a town of Hindooftan, in Goconda; 12 miles S. W. of Malar.

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 lost their interest, in consequence of the great improvements of modern surgery: they consist of a "Synopsis Chirurgiae," printed in 1566, and afterwards translated into French; a Latin translation of Hippocrates' "De Alimento," with a commentary; and a treatise, entitled "Chirurgia Artis ex Hippocrate, et Veterrn decreatis ad rationes normam redacta, Libri tres," 1580. Elyo. Dict. Hist.

GOURNAIL, le Jars de, Mary, was born at Paris in 1596. She was, while very young, deprived of her father, and acquired an adoptive one in the celebrated Michael 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 lessons of youth, and was intimately acquainted with the learned languages. She maintained a correspondance with many of the most eminent literary characters of the age, by some of whom she was honoured with the title of the "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 fluff and awkward style, and her talent 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 1645, in her 79th year, and was honoured with many epitaphs from literary characters. Her works were collected in a quarto volume, under the title of "Les Avis ou les preludes. M. Demoiselle de Gournall." Her temper was apt to be violent, and she was very reffentful 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. Moreri.

GOURNAY, in Geography, a town of France, in the department of the Lower Seine, and chief place of a canton, in the district of Neuachalet, 24 miles E. of Roven. N. lat. 49° 27'. E. long. 4° 47'. The place contains 3,543, and the canton 11,301 inhabitants, on a territory of 185.5 kilometres, in 19 communes.

GOURNEI, a town of Egypt, on the site of the ancient Thebes.

GOUROCH, See Greenock.

GOURRI, a town of Abyflinia; 35 miles S. W. of Affab.

GOURVILLE, John Herauld de, in Biography, born at Rochefoucauld in 1625, 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 Comte, and was employed by the superintendant 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 ministry. He died in 1705, leaving behind him "Memoirs of his Life from 1642 to 1692," 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. Moreri.

GOURY PASINIUS, 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 inointments for the taches.

GOUSET, James, in Biography, was born at Blois in the year 1635. He was educated for the ministry, 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 settled, 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 "Dissertationes in Controversy with the Jews," 1699. "Commentari Linguae Hebraicae," 1712, which form a valuable Hebrew dictionary, of which the best edition was published at Leipsic in 1743. "Dissertationes in Epistolam Pauli ad Hebreos," &c. 1712. At his death he left behind him numerous MSS., among which are commentaries upon the whole of the sacred Scriptures. Moreri.

GOUST, Gour, a French term, for what the Italians call gufso, and we taffo.

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, Arthritis, (from ἄρθρον, a joint, with the termination ἱτις, 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 Arthritis, 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 ὑατηξής, podagra, was employed; which, to become a generic title; for gout in the hand, the word πέρναξ, chiraqs; and for gout in the knee, ώατηξής, γωνιράς; and so on. Among the species of arthritis was also included the ἱέβιατα, ἱέβιατικα, or ἱεβ-γούς, 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 pathologists, who considered the disease as arising from the flow deposition of a morbid humour, goutain, as it were, upon the joints; hence, the name gouti, or drop, was applied to the disease. This term, according to Du Cange, was used by Radulphus, a Dominiean of the 13th century, who writes, "cum gutti, quam podagrum vel arthriticum vocant, frequenter vexaretur." Mulgrave 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 atomic 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 flate the causes 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 eruptions 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 perurbation about the former; a frequent numbness, alternating with a tinge of prickling, 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 flag 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 fad to resemble the pain of a dislocated joint; as it becomes severer it is sometimes described as resembling the pain of a tension, or laceration of the ligaments, sometimes as like that from the gnawing of a dog, and sometimes as a feeling of weight and concretion of the membranes of the part, which becomes so exquisitely tender, as not to endure the weight of the bed clothes, nor even the flashing of the room from a person walking briskly in it. Hence, great reliefs of the whole body, and especially of the part affected, always accompanies this patient, constantly changing his posture, with a view to ease the pain, which, whenever it subsides, 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, is 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, itizes the other foot in the same manner as it did the former, both in respect to the vehement and duration of the pain. Most commonly the foot first affected becomes quite easy, in such a case, and even as strong and healthy as if it had not been affected; 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 or alternation 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 seldom, 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 are more debilitated, either by age or the long continuance of the disorder, it will not
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 inter-
vals become shorter, and the attacks become annual; after-
wards 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 stage 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
occasion or other, affected. It sometimes feizes on two
different joints at the same time; but more commonly it is
severed in a single joint only, and passes successively from
one joint to another; so that the patient’s affliction is often
protracted for a long time. The pains, indeed, are com-
nonly less violent, in this state of the disease, than they
were at first; but, in addition to them, loss of appetite,
sicknes, and other symptoms of the atomic gout, now
affect 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 con-
dition 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 disfigured, that although the patient can
stand, and perhaps walk a little, yet it is very slowly, and
with great lamens and difficulty, so that he is fearfully 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
readily recurred, this immobility of the joints is farther
increased by the formation of concretions, of a chalky ap-
pearance, upon the outside of them, and for the most part
immediately under the skin. The secretion or deposition of
this matter is characteristic of the disease, being the conse-
quence of gouty inflammation alone. It seems to be de-
posited at first in a fluid form, but afterwards becomes dry
and firm; in which state the concretions have the appear-
ce of a friable earthy substance, and have been called
Cauliflower (which see). From the investigations of Dr.
Wollaston, however, and other modern chemists, it has been
ascertained that they contain no calcareous or earthy matter,
but consist of a neutral fluid, formed by the combination of
the lithic or uric acid, with the fixed alkali, soda,—consti-
uting a lithate or urate of soda. These concretions form pri-
cipally about the joints of the toes and fingers, in little no-
dules, which Sydenham compares to crab’s eyes; but some-
times they appear about the larger joints, as the elbow and
knee, occasioning a whitish swelling about as large as an
egg, which becomes gradually inflamed and red. Mr. Wat-
ford has described an example of a very extensive deposition
of urate of soda, in a greater man, who was a martyr to the
disease. Chalk-flours do not generally envelop the joints of
great toes, formed tumours upon his leg, and, being mixed
with the synovia of the large joints, rendered this fluid as
thick as cream; but “the joints of the fingers were puffed
and knotty, every knot being a lump of chalk,” and it was
told,” he adds, “that when he played at cards, he used
frequently to score up the game with his knuckles.” (See
Medical Communications, vol. i. p. 3.—See also Parkin-
son’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. Syden-
ham, indeed, and some other writers, confine the appellation
of regular to gout in the feet only; and consider it as irregu-
lar, when it attacks the hands or other joints. But Dr. Cul-
len, Warner, and the physicians of the present day, in gen-
eral, agree in calling the disease, when it consists only of an
inflammatory affection of the joints, the regular gout; “and,”
Dr. Cullen observed, “whatever symptoms we can per-
cieve to be connected with, or to depend upon, the dispo-
fition which produces that inflammatory affection, but with-
out its taking place, or being present at the same time, we
name the irregular gout.” First Lines, § 578.
Irregular gout, anomalous, internal or atomic gout, as it
has been also called, consists of various symptoms of disor-
der in the internal organs of the body, which do not differ
from the symptoms affecting the same organs under other
circumstances; it is, therefore, inferred that these symp-
toms are of gouty origin, when they occur in persons bear-
ing the marks of a gouty diathesis or disposition; and espe-
cially when, in such habits, either a manifest 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 affec-
tions of the stomach; such as loss of appetite, indigestion,
and its various concomitants of sickness, nausea, vomiting,
flatulency, 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,
collines also commonly occur; but sometimes a loose-
ness with colic pains. These affections of the alimentary
canal are often attended with all the symptoms of hypochon-
drisia; as dejection of mind, a constant and anxious atten-
tion to the slightest feelings, an imaginary aggravation of
these, and an apprehension of danger from them.” In the fame
atomic gout, the viscus of the thorax are also sometimes affect-
ed, and palpitations, faintings, and allhem occur. And the
head also is often disordered, with pains, giddiness, somno-
lessness, and even apoplectic and paralytic affections. (Cul-
len. See also Mulgrave “De Arbireide Acromas.” 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. 72—96,
second edit.)
We may here remark, in passing, that many errors have
probably been committed, in considering almost every spe-
cies of indisposition, that occurs in gouty habits, as arising
from
from the gouty diathesis. We remember to have heard this
point frequently infallibly upon by the able professor of physic,
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 dyspep-
sia, or indigestion, in habits not gouty; such are the various
hypochondriac sensations; the palpitations of the heart, often
arising from over-diffusion 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 diffusion of the stomach, which
impedes the descent of the diaphragm; and the head-ache, giddines, &c. which are daily observed to be
connected with impaired digestion. On the other hand, in-
flammatory disorders of the lungs and other visceræ, con-
gelations in the head, inducing head-ache, somnolency, verti-
igo, &c., and ultimately various degrees of paralytic and apoplectick disfaee, 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 all without continuing for the usual time, and receding
gradually, as is common, the pain and inflammation sudden-
y and entirely cease, while some internal part becomes dis-
ordered. This has been called the retrocedent or rejected 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 existed itself. The stomach is for the most
part commonly affected, whence violent pain, listlessness, vo-
miting, anxiety, &c: the heart and lungs are also occasion-
ally attacked; and sometimes the occurrence of apoplexy,
palsy, or delirium, mark the head as the seat of the retro-
cedent disfaee.

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 conjunctions not
gouty: and it has probably been sometimes supppered to be
of gouty origin, when it arose from the ordinary causes.

Dr. Cullen affirms, that he never met with any instances of
misplaced gout in his practice, and that no case has been dif-
tinctly made out by medical writers, except that of pulmo-
nary inflammation. But he had known two varieties of in-
ternal disfaee alternate with external gouty inflammation;
avs. the one an affection of the neck of the bladder, pro-
ducing pain, stricture, and cariesus vesicæ: the other an
affection of the rectum, sometimes marked by pain alone in
that part, and sometimes by hemorrhoidal swelling.
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 predisposing 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 disfaee is said to be hereditary. This
passion, indeed, has been controverted, especially by Dr.
Caddogan (see his Diff. on the Gout, and all Chronic Dis-
cases, p. 7;) but the disfaee has turned upon a mere dif-
pate 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-likeesses, for instance, in features, in
voice, complexion, &c. It is true, indeed, as Dr. Caddogan
contends, that some persons acquire this gouty disposition, who
have it not by hereditary transmission; and, on the other hand,
that the hereditary disposition may be counteracted by
various causes, but particularly by certain modes of life, so
that the disfaee itself shall never appear. Yet it is equally
tru, that the same occasional causes, which will excite the
disfaee in those who are hereditarily predisposed to it, will
not produce it in others, otherwise 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
full 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 con-
 siderable degree. Hippocrates remarks, that eunuchs are
not liable to be affected by gout, nor boys previous to vene-
ry; but the latter remark included in the remark is probably
unfounded; since, with respect to the latter, the disfaee,
as we have already stated, is almost peculiar to an advanced
period of life; and the eunuchs, who, in the time of Hip-
ocrates, 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, ob-
erves 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 in-
dolence 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
disfaee with these remarks. "The gout generally attacks
the elder persons who have spent the greater part of
their lives in cafe and indulgence, both in the use of
high feeding and of wine, or other spirituous and fermented
liquors; and who, in conformance of the figurines of ad-
anced 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
disfaee from their parents; or, if not, they indulged in
precipitate and excessive venery, or left off entirely those ex-
ercises which they had previously used with great activity,
and have been besides most indulgent to the appetite, and
drank to excess of vinous and spirituous liquors, afterwards
suddenly turning to those that are thin and cold." (Syden-
ham, Tractatus de Podagra.) Thefe facts have been long
known. There is a Greek epigram literalliy signifying
"of limb-relaxing Bacchus and limb-relaxing Venus is born
a daughter, the limb-relaxing Gout." And a similar ob-
ervation is contained in the adage, "Bacchus pater, Venus
mater, et Ira obstetric Arthritis." 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 employed 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 livelihood, and to exchange a luxurious table and indolence for a spare diet and activity, have left their gout. He mentions particularly the influence of a certain person, who enjoyed a rich living, and had been an old and constant sufferer from the gout; but having been 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, having lost all his troublesome and moral fatness, he never once had a fit, though he lived several years after the event." (Van Swieten, Comment ad Aph. 1555.) Several anecdotes of a similar nature are related by the indubitable Schenckius, (Obv. Med. Rariora, lib. 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 manifest from the form and temperament of the persons in whom it occurs. There are especially men of robust and large bodies with large heads, and of full and corpulent habits. They have commonly also a coarser skin; and if, with the ancients, we might denote the temperaments of men by certain terms, we should say that the gout especially affails men of a choleric-fangwine temperament, and seldom affails 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 affails 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) long before the menstrual evacuation has ceased;" and he had found it occurring in several females, whose menstrual evacuations were more abundant than usual. (First Lines, § 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 menorrhagia than others.

It is obvious, then, that the experience of all ages consents in allowing 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 so much upon predisposition, that it is difficult to allude 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 seeds 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. 556, and 1555,) 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 Aetius, in recounting the general causes of gout, says, there are, "abounding diseases, frequent drunkenness, and, above all, an immediate use of venery." (Sermon xii. Cap. 6.) Sydneyham and Van Swieten add their testimony to the fact. Intemperate living, night-watching, excessive anxiety and attention to business, all of which greatly deprees the power of the body in general, and of the stomach in particular, depressing the appetite, and producing a feverish uneasiness, finding, or weight about the region of the stomach, are likewise enumerated among the accidental causes of the gouty paroxysm. The same is true with respect to the violent emotions and passions of the mind, more particularly of anger. "In obliteris arthritis" is part of the adage above quoted; and the three causes of gout, intimated on by Dr. Cadogan, are intemperance, indulgence, and vexation. 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 alluring news. Instantly 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 mellow oppressive load. Perhaps as the excess of weakness is often conunined, it may be rejected by a violent vomit, or do greater mischief: for which reason such stokes of diffords are less hurtful received upon an empty than a full stomach." &c. (Loc. cit. p. 55.) The gouty habit, indeed, is often an irritable habit; and Sydneyham observes, that a fit of gout may be called a fit of anger. (See also Van Swieten, § 1578.)

Among other exciting causes of gout, the sudden ceasing from the customary exercises or labour is commonly mentioned, and its principal effect is probably upon the function of digestion, which is so 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 other 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 excess, namely, from high feeding to a very spare and ablemious diet, is liable to induce the paroxysm of gout. That such a sudden abstinence of the powerful stimulus of a copious supply of food and strong liquors, must necessarily induce a considerable direct
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 added 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, hitherto 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 system, which sometimes brings the paroxysm of gout, is excessive evacuation of any kind; such as by hemorrhages, brisk purging, vomiting, &c.; especially as 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, or the beginning of February. The fit may be produced either by the local application of cold and moisture to the foot, 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. contusion. Van Swieten considers the disease as analogous to dysentery 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 lying at his master's feet during a paroxysm of the gout, suddenly ran howling and barking round the room, expressing the pain which he had caught from his master, whose throat at the same time became greatly alleviated, &c. (Swieten Com. ad § 1255.)

Of the Diggenss. — 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, seize 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 distemper just mentioned, will serve particularly to determine the nature of the paroxysm. It must be admitted, however, there are infinities of the combination of the symptoms of the two diseases, which renders it difficult to decide to which of them the individual examples belong. (Heberden, Comment. de Morb. p. 58.)

Again, the symptoms which the irregular gout presents, are extremely numerous and proteiform. appearing frequently as dyspepsia, hysteria, hypochondriasis, althma, palpitation, syncope, vertigo, apoplexy, paralysis, &c. according to the original or acquired tendency of the constitution to those diseases. Hence the discrimination 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 malady, which we are capable of obtaining, into the operations of the animal economy, and to the means by which we can obtain efficacious of confirming themselves to the observation of the phenomena of health and disease, faithfully recording their 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 successively 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 wish 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 inerustable. "Nam quae denunm causa," as Celsus justly observes, "vel secundum valetudinem præcedent, vel morbos excitat, &c. ne superficiem quidem proficillores scientiam comprehendant, sed confidentia proficuum." (De Med. Phys. lib. 1.) The inquiry respecting the proximate cause of diseases is as futile as the speculations of the Curtissians to explain the essence of gravitation, and have as little to do with the advance of true medical science, as the hypotheses of an other affifled 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 prevalence of a corrupted humour in the small vessels as the essential cause of gout. Hippocrates believed this humour to conffit of bile and phlegm, which flowed upon the joints. Galen followed him in supposing the defluxion upon the joints to be chiefly pithious or phlegm, or bile mixed with phlegm. Paulus Regius attributed the disease to a redundancy of blood, black bile, and phlegm. Trallian and Celsus imagined, that it arose from the blood itself being force into the joints; and Oppenhtius affirmed that the blood in gouty people was viscid, resembling...
resembling melted glass, which remaining in the joints, produced the cretaceous matter. Arctaeus, one of the most able of the Greek writers, is the only one who passes over the essential cause of the disease, a knowledge of which he assigns to the gods alone; the evident cauæs, he says, are apparent to man. Themison, Cælius Aurelianus, and the methodist sect, attributed goüt to relaxation or vitriication of the parts; hence, however, it imputed it to the one cause, and others to the opposite. The Arabians followed closely in the path of their masters, and taught that one or other of the humours was predominant, or that they were variously combined, in cases of goüt. 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 diseæse was nevertheless attributed to a morbid or peccant matter, and fists, earth, or tartar, were deemed the immediate cause of goüt and other maladies; and Paracelsus, Van Helmont, and others, are very abusive of the ancients for promulgating so many absurd doctrines. When the mathematical and mechanical philosophers arose, they took up the hypothetical doctrines of their predecessors, and reasoned concerning the action of these supposititious humours, fists, &c, upon mechanical principles; the chemical doctrines predominated, however, over the ancient humours. Thus, to use the words of Dr. Warner, "according to Sydenham the morbid matter consists of the putrefying heat and acrimony 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 vifcid forum become ichorous and corrosive: Bennet 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 saline, 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 fists: Ingram will have it to be a conglomeration 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, vifcid, corrosive, saline, urinous, or tartarous, fo Dr. James, whose name needs no addition, differing with them all, hath judged this acrimony to be earthly." (See Warner on the Gout, p. 91.—See also a sensible and learned disquisition on this topic, in an Historical, Critical, and Practical Treatise of the Gout, by Thomas Thomson, M.D. London, 1742.) But such hypotheses did not die with Dr. James; for in a treatise on the gout, published in 1853, we find the following statement: "The prevalent cause of gout appears to be, a peculiar saline acrimony existing 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 indeinite, hypothetical, and practically useless, with those that have preceded it.

On reviewing these opinions of men, who have been deservedly esteemed the ornament of their profession, some readers may express their surprize that such an extraordinary difference should be found among them; and that so much error (for at 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 upon 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 source 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, reflecting 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 diseæsed. 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 for is apparent from its not occurring in all cases of gout, and from its action 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 vesicles in particular parts acquire the power of secreting or otherwise producing new fluids, when inflammation is induced. Thus a blow in a flthy 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 vessels and other internal parts? yet no such deposition was ever observed; those parts remain invariably free from it in the most acute forms of the gout, and the appearance of chalk-dust is confined exclusively to the membranous and ligamentous parts which exhibit inflammation externally. In the next place, the frequent and sudden translation of the diseæses 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 manifestations of other inflammations, in which no peculiar matter is produced, are exceedingly common. Besides, up in 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 insulant and exciting inflammation in the joints, but sedative and destroying the tone or energy of the stomach. Further, as Dr. Cullen judiciously 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 goüt do not operate upon the state
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 useless, 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 philosophers, 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. §. 735—6.) But it is sufficient to persuade 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 phræalogie; and therefore that it is practically as useless as that which he contovers. 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 solid, 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 those, who confine the origin of gout to the one or other part of the fibres exclusively, must 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 adhuc obscurior quæstio clt.* says Dr. Heberden, *quam que veratür de hujus morbi causis, effectibusque, et remediosis.* (Comment. de Morb. 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 confusion has taken place, and which has perhaps been popularly solved with considerable incorrectness: we mean the question, whether regular fits of the gout are fatal; 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 consists in an effort of the constitution, by which the morbid matter is thrown off through the part affected. In a number of infinances, beyond a doubt, the various symptoms of indigestion, whether affecting the stomach and bowels only, or the lungs and heart by vicinage, and the head by sympathy, are relieved or altogether carried off by the complete fit. Perhaps Dr. Heberden is fearfully 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 flight indiposition after other violent diseases; he appeals, however, to an ample experience in support of his opinion. He thus writes: (we tranflate from the Latin edition) *There are some countries in which the itch is a very frequent disease, and there this eruption is deemed fatal. 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 those 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.*—*1 confes,* he adds, *that I have seen some persons who rejoiced on the first attack of the gout, as if it afforded 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 diseasc, more certainly originated from that care, 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 pally, althma, small-pox, and infancy, of all which I have witnessed many examples; yet no one will call those diseases fatal. On the other hand, gout frequently occurs to persons afflicted with vertigo, althma, indigention, and melancholy, where, so far from alleviating these disorders, it produces a considerable aggravation of their symptoms. Besides, in some patients, all these complaints concomitantly accompany the paroxysm of gout, and continue during the whole of its course.* (Loc. cit. p. 36.)

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 soon 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 fatal. We may judiciously 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 perfomances who enjoy leisure and affluence, and all the good things of life. Louis XIV. of France happened to labour under a fitulna in the anus, and the surgeons of that time were constantly called in by his fashionable subjects to administer relief to imaginary fulneas; which royal disease they persuaded themselves had attacked them: and it is probable, as Dr. Heberden lugggests, that had there existed any medicated waters in France, capable of producing fulnea, they would have been visited with the fame anxiety with which our countrymen haffen to those of Bath, in the hope of returning with the gout.
GOUT.

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 salutary, that it ought not to be cured, and could not be cured without the most imminent danger to the patient. Nay, further, 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 phyic, no longer to call the disease its opprobrium, until the patients lay aside its prejudices and fears, and have a disposition to be cured. “Utinam,” he adds, “tan in promptu ellet in venire, quum tatum adhibebere, podagre remedium.” (Comment. p. 43.)

The treatment, it is obvious, must be necessarvly 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 which is proper during the interval.

Treatment 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, 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 hypothesis 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 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 febrile 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, liniments, and illuminating substances, which have been occasionally recommended, Dr. Cullen concludes, that from any of them there is danger of rendering the gout retrocessed; 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 used, 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 swollen and painful, are more acutely sensible to cold, as well as to other impositions, than in health; but no covering beyond what is sufficient to prevent a troublesome sensation of cold, if that should occur, can be necessary. (Hepburn.) 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 subjects vinous and fermented liquors should be altogether abstained from during the fit; and the diet should consist of light aqueous and vegetable matters, or that animal matter, the bowel should be kept open by laxatives administered, and the skin moist by diaphoretics of the neutral sort. 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 healthy men, Sydenham, Cullen, Huxham, and other able authors, concur in recommending the employment of blood-letting from the arm. This, however, they do not recommend to be often repeated, or in any case, it may prove dangerous. Local blood-letting, by means of lancets, applied to the foot itself, promises more advantage, and experience itself has proved the efficacy and safety of the practice. (See Cullen, Firil Lines, par. 563 — Muigrafe de Archite, regulari, cap. 8. § 4.) Cupping and scarifying the neighbouring parts have also been found beneficial. (Muigrafe.)

We are persuaded that this hypothesis has had much more influence than observation and experience, in exciting the general fears about interfering with the progress of the gout, inflammation, and of the danger of its being driven to some interval by such interference. When it was believed, that a quantity of morbid matter exsulted in the inflamed part, it was inferred, of course, that it could only be removed by expulsion or by purgation, in which last case it must fall upon some other organ. We know very well, that the same 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 hemorrhage will be checked,” said the theorist, “if you allow the skin to be cooled, and the putrid matter must therefore be blown 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 washing the skin with cold water, even under the full eruption of fevers, 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 Comm. effects of a removal.) Nor is a considerable experience of the safety and efficacy of a similar practice, in fulminating the inflammation of gout, wanting. The great Dr. Harvey himself, whose name is immortalised 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 rub his gouty feet with snow, and afterwards, emboldened by success, 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. Aetius informs us, that he had seen a patient labouring under what he called a bilious gout, “who obtained extraordinary relief from immersing and keeping his feet some time in cold water.” And it is an aphorism of Hippocrates, that “cold water, copiously poured upon swellings of the joints, painful ulcers, gouty diarrhoea, and convulsed limbs, keels and removes the pain.” (Aph. 25. sec. 5.—See also Hepburn Comment, p. 43. — 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 Dittera-
tion on Gout, &c. Lond. 1804.) who brought forward about
thirty cases, in which the application of cold water to the
inflamed part, during the gouty paroxysm, was invariably
and speedily successful in relieving the pain and removing the
disease, 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
whofe fevem 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 intensity,
and active remedies are, therefore, the less required; but
from what we have detailed above, it appears at feaft highly
probable that, in the reftr attacks of gout, the application of
cold, judiciously employed, fo as to remove the morbid
heat and no longer, would always be safe, and would con-
tribute as well to shorten the paroxysm, as to diminish the
fevering of the patient, and to prevent the junctions from
the injury, which protracted inflammation and morbid effusions
necedarily occasion.

The operation of purgatives, which is known to be effen-
tially useful in other inflammations, has been confidered as
beneficial in the gout by fome 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 re-
ftult of experience, we should have been disposed to bow to
his authority; but his theory appears to have had at
leat an equal share in producing this conviction; and
unfortunately this theory involves the most gross contradic-
tion. In the beginning of the paroxysm, we are told that there
is great danger left purgatives should inflame the inflammation
of the foot, "by throwing back into the mafs of blood that
pecant matter, which nature was protruding to the extreme
parts." (Tract. de Podagra.) But after the termination of
the fit, there is extreme danger, "left a new paroxysm in
the foot, equally severe with the former, should be
produced by a purgative." (Ibid.) So that this theory
blows hot and cold, like the fayir in the fable; and
defere dangerous purgatives draw the pecant matter out of the foot,
when it happens to be in, and are the most effeclual 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
anaodyne given after the operation. (Differt. de Micta San-
guinico, &c. 1686.) Van Swieten observes, "many phy-
cicians 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 Hoffmann, who recommends gentle
purgatives in all cases of local pain, and has mentioned an
influence in his own person of the most striking benefit deriv-
ed from a purgative taken immediately before the fit of
gout. An influence 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 initial symptoms of the fit began to appear; the medicine
employed in this influence consisted principally of feverfew,
in the dose of about fifteen grains. We have been
this medicine used in a few cases, with some relief, in smaller
doses, and without any untoward consequences. That pur-
gatives, 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 confider as te-
lerably well established on the grounds of observation; al-
though we do not doubt that many of the cases of repeated
gout, which have been attributed to such caufes, may have
really occurred, under circumstances of broken and foible
constitution, or of peculiar idioftarcy. 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 repulition of the gout, which
might be more correctly explained upon other grounds.
For every inflammatory disease that occurred, even at the
distance of several months from the effusion of the fit, has
been confidered as the refult of the premature cure of the
gout; whereas, it is next to impossible that fo long an inter-
val could have taken place between the eame and its effect;
and, on the other hand, as gout is most frequent in pletioric
habits, which are also most liable to inflammatory dif-
ces, the occurrence of pleurisy or apoplexy, in fuch caufes,
is doubtlefs to be attributed to the pletorina, 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 ufe 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 skin and great febile excitement are connected,
generally fails to give relief; on the contrary, that it tends
to increafe the heat, fever, and refleffines, and, with them,
the pain likewise. When, however, the violence of the
paroxysm is somewhat abated, yet continues to return, fo
as to occasion painful and reflieffed nights, opiates may then
be given with safety and with advantage, efirecially in the
case of persons advanced in life, and who have been often
affected with the disease. The hypothetical objection to the
ufe 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. 133-156.)

Hitherto we have seen that the practice, generally pur-
fiued in the paroxysm of gout, is merely palliative; an actual
cure being deemed a deludement by most perfons, and a
thing improper to be attempted by others. Of late, howev-
er, a medicine has been introduced into this country from
France, which is made to possefs a specific power over the
gouty paroxysm, which it removes "cito, tut si, et jucundum."" The
composition of this medicine is at present unknown,
but it has been aecertained that it is a vegetable matter, and
it is sold by the inventor to be a plant heretofore not ufed in
medicine. It is called eau medicinale d Haffen. It
has appeared, in many infances in which it has been employed in
this country, and that in perons of the high rank and char-
acter, to possefs 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
tue of his limbs which he enjoyed before the fit. It is said
that, in general, it increases the various exercitions considerably,
if taken in the full dose, producing several loose motions
from the bowels, a free perspiration, and an increased di-

charge
charge of urins. But the influence of the medicine on the gouty paroxysms 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 evacuations. No untoward circumstance whatever has yet occurred, in consequence 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 G. Jones. M. D. Loud. 1810.)

Treatment in the Interval.—Whatever method is adopted in the treatment of the fit of gout, whether it be merely palliative, or so active 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 cure medica, 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 causes, or partial nature of the disease; for upon this point we have no actual knowledge: but, as we possess some knowledge of the exciting 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 temperance and indolence are the parents of the gouty diathesis, where it is not hereditary, and are the chief agents in exciting it to activity, where it is. The inference, then, is obvious: by temperance and activity, 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 debauch, 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 phlegoric to a morbid degree, upon diet which is barely sufficient to support life in others. Perhaps Dr. Cadogan's toot 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 fancies and condiments, or by interposing liquor of any kind) "and will bear without the least pain, dilution, excitation, or uneasiness of any kind, &c. he may be said to live in a very prudent well-regulated state of temperance, that will probably prefer 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 relish 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 university 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 abstemious living, recurred on a short indulgence on revisiting Oxford; but he has since that time entirely kept the foe 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 four severe fits in my younger days, but also emerged from the lowest ebbs of life, that a man could possibly be reduced to by colic, jaundice, and a complication of complaints, and recovered to perfect health, which I have now uninterruptedly enjoyed above ten years." (Lec. cit. p. 83.) Dr. Heberden likewise observes, that although complete cures of the gout are extremely rare, yet he has seen more than one instance in which, by a total abstinence from animal food and wine, the patients were restored from a state of extreme debility and misery, to such a degree of health and strength, as rendered their life no longer unprofitable 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 already have experienced two or three paroxysms. In older habits, where the disease is of longer standing, a complete cure cannot be so confidently anticipated; but experience has shown that the severity and the consequent evils of the disease may be effectually mitigated by temperance, even under such circumstances. It is a most dangerous and mistaken notion that the gout is to be encouraged; for its tendency is to increase in frequency, and in duration, to cripple the limbs, and to render the body liable to a variety of disorders, which tend to render life both shorter and more miserable than it would otherwise be.

The fear of the pernicious consequences of rigid temperance is an unfounded prejudice, very prevalent in this country; but if there be any danger, it can only originate in general from the fulness with which an extreme change is made. We have seen, in the case of the miller of Hereford, however, what a small quantity of nutriment absolutely requisite for the wants of the constitution, and how beneficial even an extreme change of diet sometimes proves. (See Convulsion.)

The next point of management in the interval, which, together with temperance, conduces to the prevention of the recurrence of gout, is exercise. This tends to obviate palsy, on the one hand, by promoting the circulation and all the secretions, and to strengthen the body, on the other hand, and promote the function of digestion; and plethoric and indigestion, as we have already stated, commonly preclude the gouty paroxysm, and are connected with the gouty diathesis. By those who cannot walk, which is the best mode of exercise for the gouty, riding on horseback, or even in a carriage, should be substituted. Even fencing, where these modes of exercise cannot be resorted to, may be an useful succedaneum. Dr. Cadogan's directions on this head are worthy of attention. If the patient "can neither walk nor ride at all, he must by degrees be brought to do both."
both by the assiduous 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 spices, 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 that 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 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, supposing always on the first fumination 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, however, that the habit of body is only to be corrected by habitual maturations; 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 constant, and continued through life."

It has been fupposed by some persons, that an ablemious 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 Cullen, who says that "some, by cleaning themselves thoroughly by drinking aies' milk, have for ever banished the disease; and others, by abstaining, during a whole year, from wine, mufle, and veal, have obtained a security for it from the remainder of their lives." (De Medicea, lib. iv. cap. 22.) In a few cafes, this plan may possibly have succeeded; but it is well known that many persons, who, by entering on an ablemious 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 ablemious 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 become established by a repetition of the fits, or is hereditary in its origin. In such cases, the maturations, which we have proposed, are not easily pursued to the requisite extent, and are commonly attempted even with reluctance; men, therefore, have been very disinclined to find a medicine which might answer the purpose, without requiring a restraint on their manner of living. Of this desire numerous empires and self-interested pretenders have taken advantage, and have been induced either to mock the gouty with inert medicines, or have falsely employed those of the most pernicious tendency. It is unnecessary for us to inquire into the nature of those alleged poisons, which, after being for some time in vogue, were neglected or exploded, as their injurious or injurious qualities were thus acknowledged. But after pronouncing 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 no long time ago. If the gouty constitution is created by a series of high-feeding 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 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 arnica montana and gentian, and of the tops and leaves of germander, ground-pine, and centuary, 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 Medical Off. and Inquir. vol. i. art. 14.) In the work just referred to, Dr. Chalmers has shown that a similar competition was used by the ancients for the same disorder. Such a formula is given by Galen, in his treatise De Antidotis, lib. ii. cap. 17., which he says he had used himself. Chalmers Aurelianus speaks of similar medicines, under the denomination of anemia medicamenta, from their being taken for the space of a year. Allius gives, among other gouty medicines, an "antidotus podagricus et duobus centuriae generibus," which differs from the Portland powder in one ingredient only. But several of the ancients considered the long uninterrupted use of these medicines as dangerous; and affirms 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 all, soon after finishing their course of medicine, have been attacked with apoplexy, asthma, or dropsy, which proved fatal." (Firth Lines, par. 557.) Dr. Hibernian, 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 disease, by strengthening the remach 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 disease, 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 remunctive powder, while the full diet was continued, appears to be extremely probable: for the plethoric must have been increased in proportion to the artificial increase of the digestive powers. We should, therefore, be disposed to conclude, that the confiant use of such a medicine must be pernicious, unless it was 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 intervals between the paroxysms of gout, and in many instances with considerable alleviation to the disease, rendering the
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the fifth milder, and the intervals between them longer: we allude to the urate of ammonia; 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 urinatory concretions,) has led to the theory, that this acid, or its elements, is the morbid humour of the gouty; and therefore naturally suggested the idea of using alkaline medicines as remedies for the disease. And as secoent drinks are found to increase the gouty diathesis, and to increase the disordered state of the digestive organs; alkaline medicines have been found 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 stomach; especially the preparations of chalk, lime-water, and magnesia. Magnesia is perhaps one of the best medicines of this sort for the gouty, as it not only corrects the acidity of the stomach, but at the same time is laxative to the bowels, and thus contributes to obviate phlethora. When these acetids do not sufficiently open the bowels, or do not prevent colic, a little rhubarb, aloes, or some other aromatic purgative should be conjoined with them. It appears, from some experiments made by Mr. Home and Mr. Brando, and recently published in 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 any of the alkalis; it is probable, therefore, that it may be more beneficial in the gout. As a warm laxative the tincture of gum Arabic was much recommended, and as it combines a stimulant with an evacuant property, it may be serviceable in some constitutions.

Cure of the irritable Gout.—We have already remarked, that false theory has led to much false alarm, and doubled as to many mistakes in practice, especially relative to the atomic gout; all the various symptoms of dyspepsia, and hypo-chloridrias being often supposd to be gouty, when no natural gout had ever appeared. Hence fomentations, blisters, rubefacients, and other local stimulants to the extremities, the Bath waters, hot pediluvia, &c. have been employed to bring on the gout in the feet, instead of relying on the remedies which might restore the functions of the digestive organs. The Bath waters are certainly to be recommended in those cases, as they are powerful as considerables powers in restoring the healthful condition of the stomach, especially when it has been disordered by irregular and intertemperate 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 stomach 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 acceent kind must be shunned, and if wine, of whatever sort, should be found to increase the acidity of the stomach, spirits much diluted with water should be substituted. At the same time, for the purpose of supporting the tone of the stomach, preparations of iron, the Peruvian bark, blisters, and aromatics in moderation may be resorted to; and laxatives, employed only so as to prevent consticence, must be taken. The propriety of frequent gentle vomiting, which the indigestion is troublesome, is more than problematical; for, while they give a temporary relief, by removing a load of undigested food, they tend to delabiate the organ, and thus to increase the evil which they were intended to remove. At the same time, all the caufes of debility formerly mentioned, must be shunned, 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.

Cure of misplaced or retrocedent Gout.—These, like the atomic gout, are in a considerable degree the humours of medical speculation, more especially the misplacd gout; they do, we believe, occasionally occur in cases of old and inactive gout, but certainly much more rarely, than is generally believed. This opinion Dr. Heberden flates from his own experience—(Comment. p. 41.—See also "Letters on the Cause and Treatment of Gout," by Dr. Robert Hamilton, Lynn, 1829.) 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 retrocedent gout; and Dr. Cullen now saw an instance of misplaced gout.

When the gout has disappeared in the extremities, the stomach and bowels are sometimes attacked with most acute pain, which is of a phlogistic nature, and to be relieved only by strong diaphoretic stimulants, and opium in full doses. Opiates are doubtless the most effectual antiphlogistics; 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 these are not effectual. Camphor, masts, affaifattias, and other strong fueling substances, may be employed as adjuvants, especially in violent cases. External heat to the region of the stomach, hot pediluvia, or the warm bath, will contribute by their stimulant powers to overcome the pains and pain. If the stomach 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, or opium, or rhubarb.

As these persons, who are subject to paroxysms of the gout, are generally phlegmics in their habit, so they are liable to inflammatory diseases, and it cannot be doubted, that ordinary attacks of inflammation of the head, of belly, and apoplexy, have been deemed gouty, and have proved fatal from the omission of blood-letting. When the symptoms are pleurisy, or peripneumonic, or the acuate pain of head, vertigo, faintness, threatening apoplexy, or the actual symptoms of apoplexy and palsy occur; we ought not to delay the exhibition of the usal remedies for those diseases, or be inclined to 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 disease arising from inflammation, than by drawing blood in a disease arising from gout." Indeed there are very physicians, who condemn bleeding and other evacuations in gout, in the extremities, gravely prescribe the prompt administration of their remedies, when the lungs, head, or other viscera are attacked with it. In a word, when the internal visera are affected with unequivocal symptoms of inflammation, the same treatment by local and general evacuation, blisters, &c. must be resorted to, as in all other cases of inflammation, regard being had at the same time (an observance, indeed, which applies to the practice of medicine.
universal to the peculiar circumstances of the patient's age, strength, and constitution.

Gout-court, in Botany. See Angelica.

Goutier, Gothe, or Goffre, 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, fuggy black earth, with little springs, that have no free outlet, and therefore swell and elevate the surface in many places.

Goujea, in Geography, a town of Portugal, in Estremadura; 20 miles S.E. of Vilafranca.

Goux de la Boulaye, Francis J., in Biography, a celebrated traveller, was born in the province of Anjou about the year 1610. 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 Asia and many parts of Africa 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 Francois de la Boulaye le Goux, en divers Pays, d'Europe, d'Afrique et d'Amérique, jusqu'à l'Année 1650." This work was published in 4to. 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 1668 he was appointed ambassador to the Porte and the great Mogul, by Lewis XIV. who was very desirous of renewing his commerce with the East. Le Boulaye died in Peru a few before he had executed this mission. Moreri.

Gouye, Thomas, was born at Dieppe in the year 1639. He was brought up among the Jesuits, and was at an early period distinguished by an ardent love for mathematical and scientific pursuits. In 1659 he was elected a member of the Royal Academy of Sciences at Paris, of which body he became an affluence attendant, and was highly esteemed for the useful contributions which he made to their memoirs. He died at Paris in 1725, leaving behind him, as memorials of his learning and industry, "Physical and Mathematical Observations tending to the Improvement of Astronomy and Geography," from Siam to the Academy of Sciences at Paris, by the Jesuit Missionaries, with Reflections and Notes, in two volumes. The first volume was published in 1688, the second in 1692, and both have been reprinted in the seventh volume of the collections of the Academy. Moreri.

Gow, in Geography, a town of Hindoostan, in Bahar; 40 miles S.S.W. of Bahar. N. lat. 25° 39'.

Gower, John, in Biography, an ancient English poet of the fourteenth century, is said to have been descended from a family at Stittenham 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 Temples, 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 satirical terms to the new king, but even reflected on the mis-government of the one who had been deposed, and whose was 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 Overie in Southwark. During the first year of Henry's reign, our poet had the misfortune to deprived of his sight, an affliction which he did not long survive. He died in the year 1402, 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 furnished with 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 Meditantis;" "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 inflection of the people under Richard II., in Latin elegiac verse; the third, or "Lover's Confessions," 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 adduced as moral examples, and taken from authors most in vogue, ancient and modern. The language is periphrastic, and the versification frequently harmonious. Biog. Brit. Warton.

Gower, in Geography, a district of Wales, in the south-western extremity of Glamorganshire, below the town of Swansea, and bounded by the Irish sea and the Bristol channel.

Gower's Cape, a cape on the E. coast of China, lying in the track from the southward to the gulf of Peking. 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 perfons concerned in the embassy to China passed this cape, a considerable number of vessels were deferred 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 August 157; he found no anchorage, and could only obtain a few cocoa-nuts in exchange for naiis; the inhabitants resembled those of Elgnor isle. S. lat. 7° 56'. E. long. 150° 56'.

Gower's Harbour, a bay on the S. W. coast of New Ireland; 5 miles N. of cape St. George. M. Bougainville calls this "Praseline 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.

Gowgathy, a town of Bengal; 12 miles N. of Calcutta.

Gown, Rome, a long upper garment, worn by lawyers, divines, and other graduates, who are hence called gentlemen of the gown, or gown-men.

The gown 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 assumed when arrived at puberty. This they particularly denominated præstites.

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 practice in an inferior way to surgeons, or those of the long robe.

Gown is also taken, in the general, for the civil magistrature, or the profession opposite to that of arms.

In this sense it was that Cicero said, "Cedunt arma toges."

GOWRAH, in Geography, a town of Bengal; 27 miles S. S. E. of Dacca.— Also, a town of Hindoostan; 5 miles N. E. of Dacca.

GOWRAN, a post 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 Hindoostan, in Oudh; 53 miles W. of Kairabad.

GOWRY-BIRD, in Ornithology, a name given by Edwards to the Loxia pulchella.

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 sea sluice, or valves used in embankments next the sea or tidal rivers, for letting out the land-waters when the tide is out, and preventing the ingress of salt-water. Some of the groves in the fens of Lincolnshire and Cambridgeshire are very large works, and cost immense sums of money.

GÔY, in Geography. See ANCE.

GOYANES, a town of Spain, in Gallicia, on the seacoast; 25 miles S. W. of Santiago. N. lat. 42° 32'. W. long. 8° 50'

GOYAS, GOYAN, or Goyza, a town and government of Brazil, extending from 43° to 54° W. long., and from 6° 30' to 19° S. lat. the inhabitants of which are estimated at 8930 whites, 29,650 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, John VAN, in Biography, a painter, born at Leyden in 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 the 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 taste 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 vivid and lively, 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 esteemed in a high ratio, which ought only to be given to works completed with the skill and purity of taste of a Caracci or a Claude. He died in 1655, aged 60.

GOZ, or GÖZEN, in Geography, a seaport town of Morocco, on the coast of the Atlantic, in the vicinity of Mogodor.

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 3000 inhabitants.

Gozo, or Gofli, a small island in the Mediterranean, about 27 miles from the S. W. coast of Cardia; anciently "Clauda," near which St. Paul failed in his voyage to Rome. Some biblical writers suppose that the Gozo near the isle of Malta is the Claudia 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 CLAUDA.

GOZZANO, a town of Italy, in the department of the Gorgo; 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 initiated with very great success the style of Maffei, his contemporary. Valari speaks of him with great esteem under the name of Benozzo, and relates histories of his many productions at Florence, Volterra, Rome, and Pisa; at which latter place he is most conspicuous in his 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 efface in which they were held.

GRAAF, Reinier DE, an excellent physician, was born at Schoonhoven, a town in Holland, where his father was an eminently 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 Succo Pancreatico, 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 1672, and died in August, 1673, when he was only 32 years of age. He published three dissertations relative to the anomaly of generation in both sexes, upon which he had a controversy with Swammerdam. His works were published in 8vo. at Leyden, in 1672 and 1703; they were also translated into Flemish, and published at Amsterdam in 1688. Hutchin, Biog. Med. Ely.

GRAAF RYNET, in Geography, a district of southern Africa,
Africa, in the colony of the Cape of Good Hope, extending to the eastern extremity of the colony. On the E. it is divided from the Kaffers by the Great Fish river, the Turkia, the Bambaria, and the Zuurber; on the W. from the districts of Zwelendam and Stellenbosh by the Camtoos river, the Cranka or Lion's river, and Nieuwveld mountains; on the N. from the Bosjesman Hottonetos by Delberg Landmark, the great Table mountain, and the Karroeburg; and on the S. it is terminated by the sea-coast; the whole length and breadth of this district may be about 250 by 160 miles, making an area of 40,000 square miles, which is populated by about 700 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 Kaffers and Boersmen. 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 repulsed by the Kaffers. The boors of this district are graziers; and it is entirely composed of loan-farms, which are 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 Africa, vol. ii.

GRAAT, or GRAY BARTON, in Biography, an historical painter, whose name is remembered principally upon account of his close imitation of the works of Bamboccio, and of his having founded an academy at Amsterdum, where he was born, to which the best artists of his time retired 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.

GRAY, in Geography, a town of Bohemia, in the circle of Leitmeritz; 17 miles N. N. W. of Leitmeritz.

GRABATARI, or GRABATARI, in Church Antiquity, such person 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 grææanem, bed; and that from the Greek λυγυρέα, a hanging bed, of ἵππον, I suspend: such as was the bed of slaves, poor people, Cynic philosophers, &c. who were enemies of luxury and cafe.

GRABAU, in Geography, a town of the duchy of Warfaw, 12 miles S. of Kalit.

GRABAU, a town of Austrian Poland, in the palatinate of Belz; 28 miles N. N. W. of Belz.

GRAFE, John Ernest, in Biography, a learned divine, and editor of the Alexandrian manuscript, in the Royal Library at London, was born at Koningberg, 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 perusal 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 elec- toral college at Sambia, in Prussia, in 1693, containing the reasons for his change, and then left Koningberg, 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 went to pay to a Catholic country, the elector of Brandenburg sent three treaties 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 Grafe, who not only read them with care, but felt disposed of discussing the question more clearly 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 strong wish to return to Berlin, that he might enjoy the benefit of a conference with him. This privilege was obtained for him; M. Grafe 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 immovable on this point, his friend advised him to remove to England, where, said he, "you will find the outward and uninterupted success 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 curiosities." He gladly complied with the advice, and was strongly recommended to King William, who immediately granted him a pension of 100l. per annum, to enable him to pursue his studies. From this time he confided 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 shewed 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 "Spicilegium S. S. Patrum, &c." vol. I. 8vo.; 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 refused, on his ordination, to receive the sacrament, on account of the omission of the prayer in the communion service, mentioning the sacrificer, 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. Grafe published "S. Justini 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. Irenæi Episcopi Lugudunensis contra omnes Hæreticos Libri quinque, &c." with prolegomena and notes. On the accession of Queen Anne to the throne, Mr. Grafe'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 forth the 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 presented.
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 Testamentum juncta Septuaginta Interpretis; tom. i contineat Octateuchum." 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 1750. 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 his usual order of publication, and of the helps 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 Cigoli, and the other to the college of Louis XIV. When he had 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 only 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 Apostles, which is said to be extant in them, wherein Mr. Whiston'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 death-bed 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 nonjurant 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 Justin'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, with learning 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 Ball's works; he likewise assisted in preparing for the press Archdeacon Gregory's edition of the New Testament in Greek; and he left behind him many MSS. some of which have been published. Big. Brit.

GRAFEN, in Geography, a town of Croatia; 15 miles S. of Varadina.

GRABO, a town of Sweden, in East Gothland; 11 miles S.E. Linkoping.

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. 35° 40'. E. long. 23° 53'.

GRABUT, in Biography, 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 fit his political opera of "Allbon 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 rehearsed several times, as the author informs us in his preface, before his majesty, "who had publicly declared, more than once, that the compositions and choruses were more just and more beautiful than any he had heard in England." We believe this prince was not very skillful 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 before the public, and when it did appear, the public seems 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 allusions, Dryden has laathed the city of London, democracy, fanaticism, and whatever he thought obnoxious to the spirit of the government at that period. Had Orpheus 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.

GRAFAY, in Geography, a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges; 9 miles S.W. of Vierzon. The place contains 2203, and the canton 5459 inhabitants, on a territory of 145 kilometres, in 9 communes.

GRACHURIS, an ancient town of Hispania Tarraconensis, mentioned by Livy, Antonine, and Polyainy, and said to be built by the proconsul Titus Gacchen Sempronius, after having conquered the Celiberians. Others suppose that it existed before Sempronius, under the name of "Iluricius," and that he only repaired it. It is now called Arreda.

GRACHUS, Tiberius Sempronius, in Biography, 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 succeeded the efforts of his instructors. He was modest, and remarkably mild in his temper; and became, at a very early age, distinguished for eloquence, solicitude, and political knowledge; and his reputation was fostered by an admission into the venerable college of augurs. It is mentioned, as a proof of the high character which he sustained, that Claudius Appius, one of the most illustrious orators 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, the replied, "Why to suddenly, you might have taken
GRACCHUS.

taken time, even if Tiberius Gracchus were the man." In conformity with the Roman custom, Tiberius passed 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 questor, in the Numantine war, to the consul C. Hothius 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 negotiate, unless it were with Tiberius Gracchus, with whose character for probity and strict honour they were well acquainted. This being admitted, a peace was immediately concluded. The treaty, though as favourable as, from 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 consul 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 interest been exerted in his favour. A fan of the injustice of the senate on this occasion, and resentment of the dishonour they had thrown upon his treaty, was supposed to be a principal cause of the subsequent 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 abject poverty. Lælius 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 Licinian law, with certain modifications, which greatly softened its operations. (See Agrarian Law.) It offered a full compensation out of the treasury 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 one another in refiling the innovation. On the other hand, Gracchus lost no time in rousing the people to a knowledge and affection of their claims as men and members of society. His speeches were addressed to their interests and their feelings: his arguments were stipidious and highly dangerous to the peace of those whole wealth was become the object of popular discussion. 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 spoilulces and household gods, when, perhaps, not a man among them ispossessed of a domestic altar, or spolburch, of his ancestors. The private men bleed and die to secure the luxuries of the great; and, by new laws which he got enacted, he rendered the property of all the old families infecure. The difficulties which occurred in carrying the new law into effect were increased by the death of Attalus, king of Pergamus, who made the Roman people his heirs. Gracchus procured a law for the distribution of his treasures among the poorer citizens, and for the disposal of the revenues of Pergamus, not by the senate, but by the assembly of the people. These measures gave him a great degree of influence among the citizens, and he conceived the design of securing the powers of which he felt himself possessed, by raising his father-in-law to the consulate, his brother to the tribunehip, and continuing to himself the same office another year. He also planned other regulations for abridging the authority of the patricians, and throwing more weight into the popular scale. The day of election was approaching, and the senators resolved to make a stand against 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 senator, as he was proceeding to the capital. He, nevertheless, advanced, and his party prepared to repel force by force. In the uproar, he attempted to speak, but his voice could not be heard. He made signs to his friends, by raising his hand to his head, to shew that his life was in danger. This signal was instantly interpreted by his enemies as a demand of the regal crown, and Scipio Nacica, the inveterate enemy of Gracchus, cried out "Since we are betrayed by our conful, let those who love the republic follow me." A general contest now commenced. The adherents of Gracchus were quickly dispersed, and himself was dispatched with a thousand blows. Not less than 300 persons were slain in this commotion, and the bodies of the dead, even that of Gracchus himself, were ignominiously thrown into the river. Several of his friends were afterwards banished, and not a few put to death, without the form even of trial, and the senate passed an act of indemnity for all those who were concerned in the massacre. The people, however, indignant against his enemies, drove Nacica 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 hasty ambition, according to the different principles of those who have commented on his actions. Many have thrown on his memory reflections as unfavourable as any the are severe. It seems to be acknowledged on all hands that he possessed great talents, and was esteemed 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 measures which he proposed; nevertheless, the historian may be fairly followed, who says, that he was actuated by the best intentions, but that he professed his design with too much violence.

Gracchus Caius, brother to Tiberius, but his junior by nine years, enjoyed the same advantages of education with his brother, which he so well improved as to become one of the ablest orators of his time. Cicero says of him, that he knew not if he had his equal in eloquence, and recommends his compositions, though unfitted, to the study of youth. After the tragic end of his brother, Caius passed some time in retirement, cultivating his rhetorical talents, and secretly preparing to act his part on the theatre of the public. In the year 126 B. C. he accompanied the consul Aurelius Orles to Sardinia as his queller, and obtained great applause, as well for his humanity and temperance, as for a strict attention to the duties of his office. The senate shewed evident signs of jealousy on account of the
the popularity which he acquired, and retained him as pro-
queillor 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 tribuneship, and such was the zeal of
the people in his favour, that the Campus Martius was not able
to contain the multitude which flocked from the Italian towns
to support his election, and many gave their votes from the
tops of the adjacent houses. Caius had not forgotten the
enemies of Tiberius, and would have punished them to their
destruction, but was probably diffused from it by his mother.
His speeches were calculated to revive the indignation of the
people against the senators for their conduct towards Tibe-
rius, and he proposed and carried motions for confirming his
brother's laws, and the pawning of others still more obnoxious
to the patricians. He was appointed commissioner 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
expenditures 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 so ingratiated him-
self 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.
Caius had transfixed this boundary, and his enemies were
perpetually on the watch for opportunities to check his
power, and to introduce rivals who might, by the appear-
ance of more liberality, depreciate 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 sacrifice either himself or his
adherents to popular fury, he proposed terms of accommo-
dation. These were rejected by the agents of Optimus the
confidant, and a price was instantly set upon the heads of
Gracchus and his friend Fulvius. A formal battle ensued,
in which multitudes were slain on both sides, and the popu-
lace without hesitation deflected their friends: Fulvius con-
ceived himself, but, being discovered, was instantly killed.
Gracchus, having feloniously imprecated upon the heads of the
Roman people perpetual slavery for the base defection of the
cause, left the city and sailed across the bridge named Sub-
licus. 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 sacred to thefuries,
where it is said a slave, by his order, first dispatched 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
overthrown by his enemies, and by them slain. His
head was cut off and fold to the confidant for its weight in gold.
The body was thrown into the Tyber, but afterwards being
taken from the water it was delivered to his afflicted mother
for burial. This catastrophe, in which three thousand per-
sons perished, happened in the year 121 B.C., and the senate
immediately proceeded to abolish 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. Caius 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 seem, that
the disturbance of the public tranquillity was rather owing to
his opponents than to him;" so that," says the historian,
"instead of calling the tumults 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
senate had assented, and as the designs of the former were sup-
ported by an armed power from the country that had never
before interfered in the business of legislation, and the intro-
duction of which gave a most irrecoverable blow to the
constitution. Caius 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 a temper he was
warmer than Tiberius, nor was he distinguished by sobriety of
manners, though in this respect he might be advantageously
compared to the Roman youth in general. Philarch.
Univ. Hill.

GRACE, Gratia, 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 fitnes for final happiness, were favours of the
greatest importance, this term is by way of eminence
applied to them. The proper signification of the word grace
is favour: favour in such a sense as denotes mercy and
goodness in a superior, either remitting somewhat of his own
right, or conferring somewhat beneficial upon others, freely
and without any obligation of debt. And because this may
be done in various modes and in a great diversity of inci-
ences, hence the word grace in Scripture is accordingly applied in
a corresponding diversity of significations. Sometimes it
signifies those extraordinary gifts and favours of the Holy
Ghost, by which the apostles were enabled to demonstrate
the truth of their communion, to preach their doctrines with
authority, to convince gainers with evidence, and to go-
vern the churches by a proper distribution of different
trials and offices. The gifts or powers, by which the apostles
were enabled to do all these things with extraordinary effica-
cy and success, 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 per-
sons, and for such purposes as God himself pleased. See
Rom. i. 9. Ephes. iv. 7, 11.

In other passages, the same word is used to signify that
extraordinary affluence and support which God has been
deprived sometimes to afford to his servants under extra-
ordinary difficulties and trials; and this is called grace, because
it is considered as given particularly and gratuitously upon ex-
traordinary occasions over and above the general supports
arising from the considerations of reason, and from the promis-
ces 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's being influenced by the spiritual
motive...
GRACE.

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 are, by divine grace, or divine providence. See Archbishop.

All forefathers 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 signifier, or lord, qualified by the grace of God signifer 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 full 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 Charites or Graces, whom they defined, the presidency over whatever was amiable and engaging in the actions or sentiments of mankind. By the undisguised goddesses, to whom they gave the names of Aglaia, Thalia, and Euphrosyne: they allegorized the pure sincerity and simplicity in which acts of kindliness should always be wrought. By the union of these persons, which are gently 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 perfon, 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, fo 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 constitutes mere beauty of form, it is absolutely necessary to give it its full force, its greatest effect; viz., that which

motives of the gospel, and the practice of which prefers men in the favour of God, and recommends them to his gracious acceptance. (See Ephes. iv. 29. 2 Pet. iii. 18. 2 Cor. vii. 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 receive men to favour in this sense Paul says (1 Cor. xv. 9.) " By the grace of God I am what I am:" and he, in the same context, declares, "The grace of God which is given unto us." (Rom. ii. 12.) The grace of God is signified by the phrase grace and truth. The Apostles' preaching is by St. Luke (Acts xix. 3.) called "the word," or declaration. "Of God's grace:" and when St. Paul declares, "I am not ashamed of the gospel," that repenting sinners are "justified freely by grace," and blames those "who continue in sin, that grace may abound." The word grace in all these passages signifies that merciful and connnionate distribution of the divine nature, by which God freely remits of his right of punishment, and receives repentant 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, shewn 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 grace of God, and the grace of God, (Clarke's Com. vol. ii. p. 265—275. 8vo. fol. ed. vol. i. p. 180, &c.) Bishop Pearce (Comm. vol. ii. p. 293.) renders Xprstv in 1 Cor. x. 30. thanksgiving, and not grace, as it is in our version; and he observes that this sense of the word Xprstv is too frequent in St. Paul's writings to require a proof of it. He adds that Xprstv 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 practise 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 irreducible or not; and it is also questioned, whether common grace is sufficient. Whether the mind be entirely passive, 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, no less 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 prescribed 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 seemeth to be only in a case where the matter proceedeth, as it were, ex gratia, of grace and favour; and not where the licence or dispensation is granted of course or of necessity.
GRACE.

beauty acquires by motion, wherein alone grace is visible.

Poets as well as painters and sculptors acknowledge the value of this quality; and the best have constantly applied it to the objects of their adulation when speaking. Milton says of Eve, "Grace was in all her steps." Ariosto adds it to the beauties of her Alvina; when he says,

"Avea in ogni parte un lascio tefte
O parli, o ridi, o canti, o paffo 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 poffessed 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, poißef it; and when we lay that it may be found in figures repose, 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 position. No figure, standing, fitting, or lying down, can be graceful, however beautiful it may be, while parts or members are presented altogether straight and flat 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 conformation 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 some have attempted to give information of the principles whereon it rests. Lazzaro, 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 (Lazzaro continues) in mine opinion the whole mystery of the art confiheth. For the greatest grace and life a picture can have, is, that it express motion. Now there is no form so fit to express motion as that of flame or fire." This text is again repeated by Du Fresnoy, and thus has Dryden translated the passage: "Large flowing gliding out-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, those 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 invidious and skilful Hogarth has built a fylem, which, if it be not altogether complete, has yet much fagacity 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 suffers, still poßesses grace. All these, 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. Where shall laugh at a tydlen 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 need no illustration. To conceive a thing in the imagination, and not to 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; having given what he calls the precise 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 consists of. Hence arises, that he narrowed the sphere wherein grace was observable, which in nature is found to be so widely extended, that, without just consideration, his inaccuracy was regarded as the raving of excentricity; whilst, a few 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 feid 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 flow; but he that requires to be taught what grace is, will, in vain, set about 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 confiant 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 realest mode to discover 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. Contrail of form will aid the beauty of the principal parts, but that contrail should never force itself into notice, the artificer would then become a parasite, and the eye would not be led to the beautiful parts, but, on the contrary, be detained 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 overpowering 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 delusion or ridicule, instead of admiration, becomes the need of the artist! No vice in art is so odious as affectation! If the best executed work imaginable be unhappily tinged 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 impressed with the passion or sentation they wish to convey in their figures, and thence conceive the action of them, are not so liable to fall into this error, as those who have had ideas more intent on making an agreeable picture, and think of the actions, before they have considered the passions of their figures. Raphael is an imitation of the former; Correggio and Parmigianino,
The best examples of grace are to be found in ancient sculpture and paintings, and in the works of Raphael. Some few of the works of Correggio, of Parmigniano, and of Guido Reni, possess it, perhaps, more refined than Raphael's; but they are far on the extreme boundary where real unaffected grace resides, that they are dangerous exemplars to a student. A confirmed artifex may observe them to advantage.

Sir Joshua Reynolds possessed it largely, and perhaps we ought to have added his name to Raphael's. But yet he is not always pure: a little too much of the Correggian is admitted in some of his fancy pictures; and particularly in the expressions of the features.

Gracie, Art of, properly denotes an act of amity, or oblivion, for the pardon of all offenders who are qualified, or come within the conditions of it. The term is also sometimes extended to an act made for relief of insolvent debtors in the several prisons; for setting those who are qualified, at liberty from their debts and confinement.

Gracie, Covenant of. See Covenant.

Gracie Cup, so called because the beverage contained in it was circulated amongst the community, or other company, at a particular time, and by a special favour. It was also called Peculum Charitatis, or the Cup of Charity, as being intended to indicate and promote brotherly love. At other times it was termed the Wafer Cup or Bowl, because each one of the company, in drinking out of it, drank health to his next neighbour in the old terms, Wai beil. William of Malmsbury, describing the customs of Glastonbury abbey soon after the conquest, says, that on such and such particular days, the monks had "Medonem in juitls et viunm in charitatem;" Mead in their cans, and wine in the grace cup. A large cup or bowl of this nature was always heretofore placed on the table of princes, &c. as well as of abbots. In the eleventh volume of the Archæologia there is an engraving of a grace cup, which formerly belonged to Glastonbury abbey, and a description upon it by Dr. Milner. The inside of this cup, which holds two quarts, is furnished with eight pegs, at equal distances, one below the other, in conformity with Edgar's law, to prevent excels in drinking. This measure allowed of half a pint to each person.

Gracie, Days of. See Day, in Law and Commerce.

Gracie, Herb of. See Rue.

Graces, Gratia, in the Canon Law, are the same with what we otherwise call provident; which see.

Graces, Expectativa, Gratia Expectativa. See Expectativa.

Gracies, Gratiae, Charites, in the Heathen Theology, were fabulous deities, three in number, who attended on Venus. Their names are Aglaia or Egle, Thalia, and Euphrosyne; i.e. shining, florishing, and gay; and they were supposed to be the daughters of Jupiter and Eury-name, the daughter of Oceanus, and by others to be the daughters of Bacchus and Venus. Volusius de Idoli lib. xiii. cap. 15. Homer (Hind, lib. xiv.) changes the name of one of the graces, and calls her Paltëhce, and he is followed by Statius. (Theb. lib. ii.)

Some will have the graces to have been four, and make them the same with the Hours, Hours, or rather with the four seaons of the year. See Hours.

The Lacedemonians admitted only two of them, whom they worshipped under the names of Clio and Phaenax. The Athenians allowed the same number, but denominated them Auxo and Hegemone. A marble in the king of Prussia's cabinet represents the three graces in the usual manner, with a fourth, seated, and covered with a large veil, with the words underneath, AD sorites III. Yet Mons. Beger will by no means allow the graces to have been four; the company there present, he undertakes to be the three graces, and Venus, who was their sister, as being daughter of Jupiter and Dione.

They are always supposed to have held of each other's hands, and never parted. Thus Horace, (lib. iii. od. 21.) describes them:

"Segnique nodum folvere gratie."

They were also represented in the attitude of persons dancing; whence Horace says (lib. i. od. 4.):

"Alterno terram quattuor pede."

They were commonly thought to be young virgins. In the earlier ages they were represented only by mere images, that were not cut; but they afterwards were represented under human figures, at first clad in gauze. But the custom of giving them drapery was laid aside; and they were painted naked to shew that the Graces borrow nothing from art, and that they have no other beauties than what are natural.

Yet, in the first ages, they were not represented naked, as appears from Paulanias, lib. vi. and lib. ix. who describes their temple and statues. They were of wood, all but their head, feet, and hands, which were white marble. Their robe or gown was gilt; one of them held in her hand a rofe, another a die, and the third a sprig of myrtle.

They had temples, as we learn from Paulanias, at Elis, Delphos, Perga, Perinthus, Byzantium, and in several other places of Greece and Thrace. The temples consecrated to Cupid were also consecrated to the Graces; and it was also customary to give them a place in those of Mercury, in order to teach men, that even the god of eloquence needed their assistance. Indeed some authors reckoned the goddes of perfusion in the number of the Graces, thus intimating, that the great secret of perfusion is to please. The Muses and the Graces had commonly but one temple; and Pindar invokes the Graces almost as often as he does the Muses. Festivals were appropriated to their honour through the whole course of the year, but the spring was chiefly consecrated to them as well as to Venus. Greece abounded with monuments facred to these goddeses; and their figures were to be seen in most cities, done by the greatest masters. They were also represented on many medals. The fowrs which these goddeses were thought to dispense to mankind, were not only a good grace, gaiety, and equality of temper, but also liberality, eloquence, and wisdom, as Pindar informs us; but the most noble of all the prerogatives of the Graces was, that they prefided over all kindneses and gratitude; infomuch that, in almost all languages, their names are used to express both gratitude and favours.

Graces. There is a good article for Fr. musie, by M. Frumery, under the term Agrément, New Encyc. Meth. p. 54: in this he candidly acknowledges all the defects ascribed to Fr. singing by Rouleau and Burney. See Agrément, Riformament, Shake, Beat, Trill, and Musical Characters.

GRACIAN, BALTHASAR, in Biography, an eminent Spænish writer, was born in 1603. He entered among the Jefuits at the age of sixteen, and became a teacher in their society,
society, 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. Morei.

GRAÇIAS A' DIOS, in Geography, a town of Mexico, in the province of Honduras, and audience of Guatemala, 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. 96° 6'.-Alfo, a cape on the N. coast discovered by Columbus. N. lat. 15° E. long. 132° 50'.-Alfo, a cape, called "Falfe 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 fleshly, from the os pubis internally, between the first and second heads of the triceps; and in its descent on the infe of the thigh, grows narrow, and becomes tendinous, a little below the farius, and is thus inserted into the tibia. It afflits in bringing the thigh and leg inwards.

GRACILIS Rectus, a name given by Riolan to one of the muscles of the leg, called by Winford the rectus cruris anterior, and by Cowper the rectus femoris. Albinus calls it the rectus cruris.

GRACULÀ, in Ornithology, a genus of the order Picæ, having the bill convex and acute at the edges, the bafe rather naked: tongue entire, sharpish, and fleshly; and the feet formed for walking. The genus graculà corresponds with the mainate of Brifton, 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 crowes; and also to Willugby, who considers them as of the fare or flaring kind. The species of graculà, described in the Gmelian Systema Naturae, amount to twelve; and this number is increased to fourteen in the work entitled "Index Ornithologicus" of Dr. Latham, by the addition of the new species leopus, and the introduction of the Linnaean Paradisæa trypis, which latter the last mentioned writer has deemed it requisite to remove to this place. As a secondary 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 comprefled at the fides; the noftrils small, at the bafe of the bill and sometimes situated near the edge; the toes three forward and one behind, the middle toe connected at the bafe to the outer one, and the claws hooked and fharp. 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 fharp; and the naked band reaching nearly to the nape. 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-mayang, and in China, whether it is imported from the latter place, its common name is Teaong. Several supposed varieties of this bird are described by writers, the most remarkable of which is that called the greater muncle, le grand moution; this entirely corresponds with the ordinary kind, except in size, when it materially exceeds, being in this respect not inferior to the jackdaw; it inhabits the island of Hainan, in Aafe.


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 bafe 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 silver-afi, beneath grey-brown, bill and legs brown. The birds build their nest in the hollows of trees, especially preferring those of the cocoa-nut: it is represented as a noisy chattering bird, of voracious appetite, and as living principally on fruit. Found in the Philippine islands.

FUTIDA. Black; external part of the quill-feathers blueish; band round the neck naked. Linn. Native of America, in the first ranked the magpie: the head with erect, short, silky feathers; noftrils oval and naked; tongue sharp; and tail even at the tip.

BAKITA. Somewhat grey; shoulders blue; quill-feathers at the outer edge green. Linn. Monedula teta nigra, Ray. Bunt-tailed grackle, Lath.

Size of the cuckow: the bill short, rather black, paler beneath and naked at the bafe; 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 Antilly islands and North America. It feeds on insects and fruits.

CRITATELLA. Black, the first quill-feathers at the bafe, and tail-feathers at the tip white, bill yellow. Gmel. Merulà fuscus grislata, Briff. Merle boppé 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 depref at pleasure; greater quill-feathers from the bafe 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 grackle sings 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 more obscure.


Native of Mexico, and the warmer parts of America; the Wilt Indies; rangers finely, builds on trees, is destructive to plantations, but useful in destroying the noxious insects that infest them. The fleth is black and unavailing. Its size 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 uncinated, and with the wings purple; the female entirely dully.


Size of a lark; and is supphed by Hallefquisit to feed on insects, the remains of centipedes and scorpions being found in the stomach. The bill is black; neck with a longitudinul rufy 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 uncinated, 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 Soumill under the name of merle des Savyes.

**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 fringe. *Pallas.*

Inhabits the Oizer banks of Dauria; 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.

**Leucos.** Black; band on the wings and body beneath white; the region of the eyes naked and wrinkled. *Lath.* Le mainite a fite jaune, Vieill. *Yellow faced grackle.*

Length seven inches and a half; bill compressed; nostrils oval; legs yellow and wrinkled. Native of New Holland.

**Cyaneus.** Striated; above tawny, beneath yellowish; head and chin varied with tawny and white; tail wedged, sharp and with the wings tawny. *Gmel. Chinkin grackle.*

Inhabits the interior parts of Guiana; is about ten inches in length, and remarkable for chinkinng 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 supphed to inhabit the Cape of Good Hope.

**Melanocephala.** Head black, front white; back, tail, and wing-coverts blue-ash, the tail with a transverse white streak near the extremity. *Don. Gracula melanoccephala, Lath.* Le mainite a Lete noir, Vieill. *Black-headed grackle.*

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 *Turdus*, 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.

**Viridis.** 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. Gracula viridis, Lath.* Le mainite vert, Vieill. *Green grackle.*

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.

**Cyanotis.** Space about the eyes bare of feathers and bright blue; head black, with a white cres of the hind part; upper part of the neck, body, capillaries, wing-coverts, and tail yellowish-green; breal lead-colour; plumage beneath white. *Don. Gracula cyanotis, Lath.* Le mainite a orelles bleus, Vieill. *Blue eared grackle.*

Length twelve inches and a half; bill black; legs blue black, with very hooked black claws. Native of New South Wales.

**Picata.** Greater part of the head, the neck; transverse band on the breast, back, border of the wings, and tail above nearly to the tip black; throat, breast, wing-coverts, body beneath, and under surface of the tail-feathers white. *Don. Gracula picata, Lath.* Le mainite pic, Vieill. *Pie grackle.*

Rather larger than the black-headed grackle, and like that species inhabits the regions of Australia; the general colour black and white, the former partially glazed with purple; bill yellow, and corresponding in form with that of the black-headed grackle; and the legs lead colour.

**GRACULUS, the Shagge, a species of Pelecanus; which see. — Alfo, a species of *Corvus*; which see.*

**GRADATION, the act of ascending, rep by rep, 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 amphitheatres: so that those placed before do no difcourage, but rather service, to those behind.**

The painters alfo ufe the word gradation for an infinible change of colour, by the diminution of the tints and shades. See below.

**GRADATION, in Chemiftry, is a kind of procés belonging to metals. It confits in gradually raising, or exalting them to a higher degree of purity and goodness, fo as to increase their weight, colour, confluence, &c.**

**GRADATION, in Logic; is an argumentation, consisting of four or more propositions, so disposed 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 fo 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; e. g. 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 chiaro-feuro 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 descent being made rapid, great force will ensue, from the strong oppositions it promotes; and the reverse will take place when the degrees of descent are prolonged, and less contrast thereby effected. The nature of the subjec,
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jeft, and the situation of the figures with regard to light, must's be the artist's guide in this matter.

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 riling by degrees, and improving each on the other. See Climax.

Such is that in Cicero to Herennius: "Africanus induftria virtutem, virtus gloriam, gloria memulos comparavit."

GRADI, Italian, degrees. Every ecclesiastical mode, and every key in secular 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, annual that flat by a natural, and the key is changed to C, add another flat and it modulates into B♭. GRADISCA, or GRADISCH, in Geography, a town of Germany, and capital of a small county, annexed with Goritz to the dominions of Austria, seated on the Lizonza, built in the year 1473 to flep the incursions of the Turks, additionally fortified in 1764, and erected into a bishopric in 1784; taken by the French in 1797; 35 miles S. of Goritz. N. lat. 46° 21'. E. long. 13° 27'. - Also, a town of Schla- vonia, on the river Sava, near the borders of Croatia, well peopled and fortified; 132 miles W. of Belgrade. N. lat. 45° 10'. E. long. 17° 50'.

GRADISello, 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 Viddin.

GRADISZE, a town of Walachia; 48 miles N. E. of Galac. N. lat. 45° 23'. E. long. 27° 19'.

GRADITz, a town of Bohemia, in the circle of Konigingsratz; burnt by Ziffa; 12 miles N. of Konig- ingratz.

GRADO, 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, GRADUATE, was anciently a church-book, containing divers prayers, rehearsed, or sung, after the epistle; called in some of our ancient writers gradale, gradamente, 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 masses; the tracts, sequences, balaheums; the credo, officitory; triffigium, and also the office for sprinkling the holy water.

"Gradale fíc dictum, a gradulibus in tabe libro conten- tis."

It is sometimes taken for a mafs-book, or part of it, instituted by pope Celelino, anno 430. See flat. 37 Hen. VI, cap. 32.

In the Roman 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 Ugolino gives us another account, and says it took its denomination gradual because sung in the gradual aecent from note to note. Magri speaks differently still, and will have it to have taken its name because sung while the deacon went up the stairs to the pulpit, to sing the Gospel.

GRADUAL, Gradualiis, 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 denounced 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-sts, 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 proficients; and the rest for the perfect.

GRADUATE, a person who has the degrees of any faculty: a graduate in phyllic, 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 collators, and patrons of churches; complaint, therefore, was made to the council of Baif, where this decree was made; which was afterwards confirmed by the Pragmatic Sanction, and again by the Concordat.

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 Ramdhen's or Troughton's, the former of which we have described under the article Engine for divid- ing 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 estab- lishment 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 inferior arts from time to time, till at length such perfection is attained, that little more can now be hoped for in the improvement of our bell 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 stages 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 altrolahs of Hipparchus and Ptolemy to enable us to give any 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-
scription of the manner in which Copernicus, long afterwards, had his artificial and meridian quadrant graduated, though we have shown under our article Circle that his parallactic instrument, with which his altitudes were chiefly taken, had its limb divided by equal divisions that were the subfences of \(3^49^1\) each.

Tycho Brahe's instruments had the advantage of a long radius, which rendered any inequalities that might occur in his divisions of less value than they would have been in instruments of short radii; the finest sub-divisions into which he professed to mark his spaces were \(10^\circ\) each, and the single minutes and portions of a minute, even to \(15^\prime\) and \(10^\prime\), 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 maquinca celeste of Hevelius; whatever accuracy his apparatus possessed, was the result of his own persevering 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 mechanick has published an account of his method of racking the external edge of the limb of his quadrant, as performed by Tompion, 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 screew 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 hardnesses of different portions of the metal on racked. The difficulties alluded to here, were acknowledged by the duce de Chaulnes, in a memoir of the Royal Academy of Sciences at Paris, published in the year 1765. The doctor calls the account of his method, "an explication of the new way of dividing," and as an original invention, it 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 Ramden) for cutting the screws of the circular dividing engine.

The use of Dr. Hook's screw for racking the limb of an almanac instrument was not, however, abandoned, without a fair trial of its accuracy in reading the quantity of the angles so measured; for Flamhead, (or Flamhead,) on his appointment to the Royal Observatory in 1676, employed Tompion to construct him a sextant of fix feet nine and a quarter inches radius, at the expense of Jonas Moore, with an endless screw of fourteen threads per inch, acting on the racked edge of the limb, and with telescopic fights, 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 an observation was unavoidably produced thereby. To remedy this evil, in the following year degree spaces, with diagonal divisors to read to the accuracy of \(10^\circ\), 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 1th of September of the year 1677. These additions, it appears, from the Prolegomena of the Historia Celestis, were inserted by Flamhead himself, and a comparison 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 1687, Smeaton says, that on looking over the observations, he detected an error of \(55^\prime\), which, upon a radius of six feet nine inches, he calculates amounts to more than \(\frac{1}{36}\) part of an inch. The screw, however, was useful for giving a regular flow motion to the telescopic fights, and though its use, as an accurate measure of a large arc, was soon abandoned in almanacal 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 ensured by the checks afforded by accurate divisors, previously made on its plane.

Notwithstanding what we have above said of the imperfect measuremen of an angle by the screw, it was not relinquished without another trial in Flamhead's time, by Abraham Sharp, his eminence in, whose skill and dexterity in manual operations of a mechanical nature both Flamhead and Smeaton have borne ample testimony; the latter of whom says, "I look upon Mr. Sharp to have been the first person that could accurate and delicate divisions upon 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 fix 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 table 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 disarrangement of the screw-work from the hand-divisions, as had appeared before in the work of Mr. Tompion; and hence we may conclude, that the method of Dr. Hook, being executed by two such masterly hands as Tompion 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 infurited, 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 mechanick, 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 still, 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 galled by too much preasure 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 fights moving in the meridian, by means of a long axis, common to both the divided arc and telescope, which
GRADUATION.

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 deferves such a name. In dividing his arc, Mr. Roemer disregarded 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 stepping, 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 straight their legs, but two fine pointed pieces of strong tempered steel were tied, or otherwise fixed together in such a way, that the distance between the two points was 1/4th of an inch, and the radius of the arc to be divided was so proportioned, from 2 1/4 to 3 feet, that this distance made a space very nearly equal to 10'; 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, by the fumbling points, as to ensure the perfect equality of the divided spaces, however carefully the fumbling points are pressed in a vertical direction; the smallest deviation on making the first impression becomes greater by preface, and an attempt to rectify any erroneous points can never be depended upon: but, what is worse, 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 as 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 artist who distinguished himself in the art of graduating astronomical instruments, was the celebrated Graham. At the appointment of Dr. Halley to the Royal Observatory of Greenwich, Flamsteed'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 standing proof of his skill, to this day, in the said observatory. This artist 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 constructing the frame-work of the iron quadrant, contrived 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 fiduciary edge with requisite exactness, and the vernier scale was fubstituted as much preferable in this respect, and the beam-compass, with equal advantage, was fubstituted for the ruler 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 flow motion was also used for dividing the vernier scale in a proper way, after its value was ascertained; and its perfection was ensured, with respect to the due inclination of its threads all round, as well as to the equality of their spaces: and haftly, in order that the advantage of continual bisecton might be introduced as a check on the degree spaces, the quadrant was divided in 96 spaces, with sub-divisions, in a separate arc: and the readings from the 96th arc were a confant tell 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 brares, which was laid over the iron frame, we shall satisfy ourselves by stating that two separate arches were ftruck by a beam-compass, painted from bending by several bracing pieces; the respective radii of which were 60 85, and 95 8 inches. The inner arch was divided into exact degrees, and twelfth parts of a degree, or 8 spaces; but the outer one was divided, as we have said, into 96 equal parts, and each of these again bisected into 16 equal parts, so that the sub-divisions were 10 each other as 188° : 139°, or in smaller number, as 25 : 12. 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 inserted therein, 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 same points of the beam-compass united, 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 to nearly together, that is, where the sweeping lines was bisected by a point put in by hand, by the aid of a magnifying eye-glasf: the distance of this point c from a or b was laid along the limb from b to c, 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 performed, 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 a c and c d; but the arcs of 15° were not divisible into a lower number than three parts of each 5°; in order to tripartite each arc of 15°, a separate arc was used, as an arc of trial, described by the original radius united, and 1/4° was 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 compass; this distance was then laid off from both ways from the aforesaid 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
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 readiness of hand, as well as observation of the eye, and caution, to preserve the regulated distances of the points, unaltered during the operation. Of course, the marking point was required to be line, and at the same time well tempered, as well as strong enough to bear pressure, which pressure was at first necessary to make it 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 trisection, and then by bisection, or vice versa, in the manner we have already described; and the delicacy 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 file 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 a rule, and a marking point, or dividing knife that would be liable to deviate a little, notwithstanding the greatest care; here another, but smaller beam-compas 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 e 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 croffed 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 q, b, d, from the arc to be graduated by the straight lines, or rather by the curved lines, which in fact were substituted, and which passed without sensible error for straight lines, when the tangent line in question was long. From the point or dot p, the curve b k was drawn, and from the dot e the curve f i; but in such a way that a small portion only of each, that lies between the circular 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 filled 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 subdivided 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 bisectsions, 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 bisection of the arc of 96 divisions.

To prove that the spaces obtained by the lines of transfer are equal to those between the corresponding dots on the points, let e f and g h be joined, also of, o b, o r, and o g; and the triangles o e f, g o h, will be very nearly equal, and equal to each other; therefore, if the common angle e o f be taken away from the equal angles e o f, g o h, the angles e o g and f o h, 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. Maldeyne has caufed an iron limb to be sublitted for the original brafs one, and has had the points of division invested on fluid 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 endless screw in form of an engine, about the year 1750, but that we think his method of dividing and drilling the holes of his plate, by bending a straight slender bar of brafs into a circle, and transferring the holes therefrom, 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 proposed by Smeaton, 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 perceiving the adum, have claffed him among the first 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 stroke drawn at one-third 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 stroke only was made, and that opposite 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 flitting too. Having (by means of the radius and bisects only) divided his quadrant into three arcs of 30° each, he set off in each of these arcs the chord of 21 20', or 256 times five minutes. This chord was taken off a scale of equal parts, and was checked by the chord of 8 40', both chords together filling up the arc of 30°. The arc of 21 20' was divided by continual bisections into arcs 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 to the premises also, that Sifton placed the fixed or central point of his compasses 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 processes as originally his own, and as he worked for the Sifions previously to 1766, we are disposed to consider Bird, and not
either of the Siflons, as the real conqueror of the methods here advertised to. Sillon (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 test of its accuracy.

It is the characteristic of a great genius in mechanics, not to tread too closely in the steps of his predecessors, 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 successes, that in the year 1740 he came to London, and was in high favor 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 compasses, as well as on the marks of the scales and circles to be divided; he also saw that bisection of an arc had so much advantage over trisection, or quinquesection, that he abandoned the latter modes of dividing altogether, and was the first probably to compute chords, to be taken from a good vernier (what he calls nonius) 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 as 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 requisites," says he, "for the performance of this work are as follows: 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, continuous to which are nonius (vernier) divisions, viz. 10 inches divided into 100 equal parts, shewing 0.001 of an inch, and by the assistance of a magnifying glass, of one inch focal length, a third of 0.001 may be taken off by estimation."

"Provide fine beam-compasses, to which magnifying glasses 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, 20°; the 5th, 40°; and if a 6th, to measure 15°, be made use of, so much the better."

"The radius of the arc of 90° at the points is equal to 95°-98 inches, from which the following numbers were computed. viz. 46.6615 inches = chord of 20°; 25.0448 inches = chord of 15°; 17.270247 inches = chord of 10°-20'; 8.8186 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 morning; 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 quadrants and scale being of the same temperature, the faint arc of 6 degrees was bisected in a."

Plate XVIII. of "Astronomical Instruments," (1) is [blank] and with a very fine prick-punch (pointtil) the point a was made; with the same beam-compass I laid off from a to e the chord of 60°, making also a fine point: with the chord of 30° a e was bisected in e. Now one point of the beam-compasses containing 60° was fixed in e, and with the other was marked: the point r or 90°: next, with the beam-compasses containing 15°, was bisected r r in n 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 12 parts, or every 5', therefore, 85 x 12 + 4 = 1024, a number divisible by continual bisections. The half chord computed was 42° 40', with which a g was bisected in e; a o and e g were bisected 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 6a 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 30°, 60°, 75°, and 90°, fell in without any sensible inequality."

"So much will suffice for giving a general idea of Bird's proceeding in dividing his astronomical instruments; but his method of transferring the divided points into dividing lines was equally original, and guarded 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 inferred by a pointtil, or piece of steel-wire, with a conical point made fall into a piece of cylindrical brasses rounded at the upper end: the steel part was 5/16 of an inch thick, and 3/16 of an inch long, and the brasses part 2 1/2 long, and 1/16 of an inch in diameter. The angle of the steel conical point was from 25° to 25°, and the point somewhat above a spring temper, so that the point made in the circle did not exceed 0.001 of an inch; as it was sharpened on an oilstone while turning round, and while drawn in a direction outwards from the point itself, the surface partook of the nature of a counter-link, and, as it were, drilled a diminutive hole of a conical shape when gently prefixed on, as it revolved in the point of bisection, which point, by reason of the four angular bars made by the interfacing 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 springdividers, 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 bisected, but not practically trisected or quinquisection 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 brass, so as accurately 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 Sillon 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 may be seen from his own words."

"The next step," says he, "is to cut the linear divisions

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from...
from the points: the best instrument for this purpose is the beam-compasses, having both its points conical and very sharp. 

Draw a tangent to the arc $b$, suppose at $c$, it will intersect the arc $x y$ in $g$, this will be the distance between the points of the beam-compasses to cut the divisions (nearly) at right angles to the arc $b$. Lodge that point of the beam-compasses next your right hand, in the point $r$, let the other fall freely into the arc $x y$; press gently with your finger upon the screw-head that fastens 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 rule.

The intention of transferring the central or reeding point of the compasses into a blank tangential line, instead of filling the said point to reed in the respective points made in the faint arc, is, that in the former case should 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 stroke, 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 slipping in a certain degree, insomuch as that a hard particle, lying under the point of reed, may cause a little deviation in the distance, before the stroke 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 setting down, and pressing on the point at reed, in a perpendicular direction. Another objection applied to Mr. Bird's scale, from which the chord-lines were measured, insomuch as the scale itself might be erroneous in some places, and would impart its errors to the arcs measured from the computed chords taken therefrom.

Besides the arc of 95°, the mural arc by Bird had an arc of 95 divisions, like Graham's, divided by continual bisections, till each of the 95 divisions had 16 sub-divisions, as a check on the accuracy of the arc of degrees; but sub-

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 professed to measure; and to effect his purpose he made ten divisions on his vernier equal to eleven on the limb of the instrument, first by computing the chord of thirty-two parts, and then by taking ten out of those parts, when bisection, as the proper divisions for the vernier; these, being made in points, were also transferred by a tangential line into linear divisions by the beam-compasses, as before described; but great care was taken, that the stroke zero on the vernier was drawn from the quadrant's centre, precisely parallel to the line of collimation of the telescope. Mr. Ludham says, that the cutting-point which Sisson used was flat in the knife-edge form, but that Bird's was a triangular prism, with a slope ground down to a point at one of the angles, which formed the cutting-point.

At the request of the commissioners 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 60l. for his plates, after having bound him to instruct an apprentice of seven years in the art of contracting and dividing astronomical instruments.

Mr. Smeton is of opinion that Bird's method of dividing may be improved in one respect, and expresses himself on the subject thus:

"I must here observe that I apprehend no quadrant, that has ever undergone a severe examination, has been found to form a perfect arch of 95°, nor is it at all necessary it should; the perfect equality of the divisions throughout the whole is the first and primary consideration; as the proportion of error, when ascertained by proper observations, can be as easily and readily applied when the whole error of the rectangle is fifteen seconds, as when it is five. In this view, from the radius taken, I would compute the chord of 16° only. If I had an excellent plain scale, I would use it, because I should expect the deviation from the right angle to be less than if taken from a scale of moderate accuracy; but if not, the equality of the divisions would not be affected, though taken from any common diagonal scale. This chord, so prepared, I would lay off five times in succession, from the primary point of given, which would complete 80°; I would then bisection each of those arches of 16°, as prescribed by Mr. Bird, and laying off one of them beyond the 80th, would give the 88th degree, proceeding then by bisection, till I came to an arch of 2°; laying that off from the 88th degree, would give the point of 95°. Proceeding still by bisection, till I had reduced the degrees into quarters of each, I would there stop, as from experience I know that when divisions are over close, the accuracy of them, even by bisections, cannot be so well attained, as where they are moderately large. If a space of 5ths 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 micrometer screw, this may be shortened by placing another line, at the distance of one-third of a division on each side of the index-line, in which case the screw will never have to move the index plate more than one-third of a division, or 5', and the perfect equality of those fine lines from the index line may be obtained, and adjusted to 5 precisely, by putting each of the fine lines upon a little plate, capable of adjustment to its true distance from the middle one, by an adjoining screw. The above hint is not confined to the chord of 16°, which prohibits the sub-division going lower than 1 5'; for if it be required to have divisions 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 lead would mark out the division 85° 20', pointed out by Mr. Bird, supplying the remainder to a quadrant from the bisected divisions as they arise, and not by the application of other computed chords." Mr. Smeton, sensible, 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 bisection, arising from Roemer's method, afterwards proposed to lay down the chord of 64', or of 85° 20', from computation all at once, and then to bisect, and complete the quadrant from the bisected divisions, which Mr. Bird himself preferred as a good method for Hadley's sextants and octants. But these plans are now superceded for instruments of small radius by the dividing engine, 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 finifhing 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 Chaulnes printed in French a folio work, entitled " Nouvelle methode pour diviser les Instruments de Mathematique et d'Astronomie," and also a work proper to be bound with the former, called "Description d'un Microfcope et de differens Micrometres destines a mefurer des parties circulaires ou droites avec la plus grand 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 describe them as far as they fall within our present purpose. This new method of dividing is performed by the affilience of compound microscopes, with cross hairs in the focus of the eyeglafs of each, to be fixed to the circle to be divided in any given situation, and of moveable pieces of brass with fine dividing lines marked thereon, which may be so fixed with wax, as to be adjustable to the point of intersection in the circle of any of the microscopes, and when duly adjusted, a sliding pointer, moving in a complex frame of brass, 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 Ramsden's 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 subject, without following the author through all his minute details. The circle, which the duc de Chaulnes 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 suppose it an astronomical circle for altitudes or azimuths that is to be divided by his method. In the first place, he proposes to have from 30 to 40 thin pieces of smooth brass about one-third of an inch long, and one-sixth broad, having each a fine stroke drawn across, perpendicular to the long sides and just deep enough to be seen; and secondly, three compound microscopes are to be provided, one to be fixed diametrically opposite the pointer, 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 opposite to each other, in a diametrical line, as can be guèfled, or roughly measured by any of the ordinary means, and a moveable division on a piece of brass already described, 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 intersecting points of the fields of view; these microscopes, it must be understood, are fixed, not on the table which bears the circle, and which is made so as to revolve on a long vertical axis, but on a fixed or stationary surrounding frame, that is connected 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 opposite division falls under the centre of A, the circle is truly bisected; but as this is not likely to be the case at the first trial, the quantity that is over or short must be adjusted, one half by the moveable division, and the other by the microscope, and the operation of reversing must be repeated, and the rectifications made, till the circle is found to be truly bisected, both backwards and forwards, by the coincidence of the divisions with the intersected 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 these two dividing strokes, after the pointer has been brought precisely to occupy the place of the other, in which situation the pointer and the fixed microscope will stand so diametrically opposite each other, that whenever an adjustable line is brought to bisect the field of view of this microscope, the pointer will be ready to cut a line on the opposite side of the circle, and whenever a set of adjustable divisions are properly placed, by the wax, on one semi-circle, the lines in the other semi-circle, directly opposite these respectively, can be permanently cut, before the moveable pieces are taken off, and afterwards the said lines so cut may be brought successively under the fixed microscope, in order that their opposites, where the moveable pieces were stuck on, may, in like manner, be cut; so that one-half of the circle will be sufficient to be divided and sub-divided by the adjustable pieces, seeing that each of its divisions and sub-divisions, brought in succession under the fixed microscope, may be instantly transferred by the pointer, into the opposite semi-circle, and also those in their turn transferred back again. Let us now see how the semi-circle is divided and sub-divided by means of the two microscopes A and the fixed one, B being no longer wanted; the first operation is the trisection of it into arcs of each 60°; for this purpose, while the pointer remains at T3 (fig. 3 of Plan XVIII), one of the points of the circle, the fixed microscope cuts at Z, or zero, i.e. the first point of the circle, to be figured 0 or 360; two moveable pieces are stuck on at C and D respectively, so as to trisect the semi-circle ZBT very nearly, and the microscope A is placed directly over C, so as to view its stroke or line at the point of intersection in the focus of the eyeglass; there it is made fast for the present; the line C is now brought under the fixed microscope at zero, by making the circle revolve, and suffered to remain; the piece D has its stroke cut under the microscope A, as before was the case with piece C, now at zero; the circle is again made to revolve till the stroke of D is under the fixed microscope 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 case an eye, looking into the microscope A, will see this dividing line bisect the field of view; but as this is not likely to happen at the first trial, the microscope must be moved one third of the error now shown, and each of the pieces C and D another third, accordingly as the portions of the semi-circles ZC, CD, and DT taken together, are found to be more or less than an exact semi-circle. The operation we have here described is repeated again and again, till the three equivalent arcs amount to an exact semi-circle; after which they are rendered permanent, by strokes made successively, on the opposite semi-circle, at the points Z and A, which trisect the semi-circle T A Z, when the adjustable strokes C and D are in succession exactly fixed in the centre of the fid view of the fixed microscope. 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 bisect the arcs of 60° each, into two of 30°, by an opening of 30°: to do this one moveable piece, stuck 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 state 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 micrometer A over it; make the table and circle revolve till this stroke 30° falls under the fixed microscope; in that situation, the stroke 60° ought to biseect the field of view of the 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 biseected, 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 subdividing is adopted by a property of the number 9, thus; having all the arcs of 10° round the semi-circle laid down, the points 90° and 180° are of course among them, and as 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 or spaces left between the divisions obtained from 10°, and those from 9° repeated, will be respectively 1°, 2°, 3°, &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 them, 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 of the rest, 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 superincumbent circle to be divided till the stroke 9° comes to zero, then a moveable piece fitted 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 those ending with 8, after those ending with 9 have been gone through; and after that, those 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 subdivided 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 into the 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 fourth and five, is evidently borrowed from Clavius the Jefuit, whose problem for this dividing a right line, or arc of a circle, was published in 1611.

Another method of subdividing 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 pocket is made to fit the arrow of the revolving table that carries the circle to be divided, so tight, that it will revolve with the divided arrow, or without it, as the case may be: to this pocket a telecope is fixed with a vertical hair in the focus of its eye-glafs, that may biseect any distant mark to which it may be directed, then a long ruler, of fix 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 telecope, 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 telecope 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 telecope, are, with great care and readiness, transferred in succession, not to one of the degree spaces itself on the circle, but to a pattern-piece of brafs, which may be afterwards fixed with screws under the object lens of the fixed microscope, so 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 pointill. In this case, the ruler, viewed through the telecope, ought to be a portion of a circle; but the arc and the chord of one degree are fairly 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 arrow 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, so arranged, constituted an engine for dividing; but the work could not be performed with such expedition as with our modern engines, where the spaces are subdivided for the microscopes, and where the touch has greatly the advantage over the figbt. 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 necessary liberty 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 best sub-divider of the 9° spaces, or other small divisions; but he has not conceived it necessary to describe, 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 measure, 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 sublitate them for the vernier, in reading off small quantities of a sub-division when an instrument was finished; which practice was left for Mr. Ramden 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 former 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 (John) 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 circles, as being liable to uncertainty in determining the primary points from which the bifectons were to proceed. 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 30°, set 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 7° 30' 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 bifectonal arc, lay between these two, and could not be obtained by further bifectons; the space between the two marks in question was therefore trifected, and the more forward of the two new points was 85°: again, the space between this mark of 85°, and that of 86° 15', was trifected; from which came 85° 25', as denoted by the more backward of the two new marks; and, finally, a fifth part of one of the sub-divided arcs was set forwards from 85° 25', to 85° 20', the point from which the 1024 divisions were inflicted from 0 entirely by bifectons. 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, bifectons, trifectons, &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 subsequent bifectons were to commence. This method is considered as being preferable to Bird's method of computing the chords and using the scale, insomuch as it does not depend on secondary or auxiliary means of ascertaining the primary point in the bifectonal arc. It has uniformity of means to recommend it in preference to those mixed methods that depend partly on computation, and partly on the extended radius.

The method of dividing a large circle, commonly known by the appellation of Ramdjin's method, or the method of coining, consists of Bird's method, and of that proposed by the de Chaulnes united: the circle is first divided by the beam-compasses 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 trifle, till they are in their true places. This method, now generally practised 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 enough 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 bifectonal arcs deform the conical shape of the points, by palling through them, and the subsequent trifectors must leave an unevenness in the metal that cannot but offend a nice eye.

Sir George Shackburgh, 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 fearfully 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 descried 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 sub-divides, 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 all 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 Ramdjin'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 1809, 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 ready 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 bifeect 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 spring-dividers, and the art of turning appearing to have approached the nearest 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 flankheft 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 trifle 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 hardened materials, and of their consequent unequal porosity; but thirdly, though there was found to be a deviation from true measurement in individual
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 consequent on 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, heretofore deferred, was successfully employed to equalize the measurements, say, so exactly was the course of the roller found to be identical in every part of its circuit. Thus, 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 movement furnished the means of correcting its own inaccuracies of measurement, seeing that these inaccuracies, once ascertained, always remained the same at the same points on 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. In the instrument, of which he has described the graduation, is a four feet meridian circle, at present the property of Stephen Groombridge, esq. of Blackheath.

"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 telescope, 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." Pages 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 same letters of reference are affixed to corresponding parts, and both are drawn to a scale of half dimensions. A is a part of the circle, the surface of which is seen in the plan, and the edge in the elevation. B B is the main plate of the apparatus, rolling with its four feet, a, a, a, a, upon the surface of the arc; these feet, being screws, may be adjusted so as to take equal shares of the weight, and then are fastened 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 E. F F and G G are two friction wheels, the latter firmly fastened to B B, but the former is fixed in an adjustable frame, by means of which adjustment these wheels and the roller E E may be made to press, 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 D are two bridges, having a screw in each, by means of which an adjustment is procured for raising or lowering the roller reflecting 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° 20', 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''. 55', or 4th part of the circle. This number of principal divisions was chosen, on account of its being capable of continual bifurcation, but they do not fall 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. 5. is a section of the full size, and sufficiently explains their construction, and the position of the glaesses; but the micrometer part, and manner of working it, are better shewn in figs. 1 and 4. The micrometer part consists of an oblong square frame, which is folded into a flat, 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 screw; a spring of filed 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 uae of which will be shewn hereafter. A fine wire is stretched across the movable frame, for the purpose of bifurcating fine dots. Two of these microscopes are necessary; also a third, which needs not have the divided head, and which must have in the movable frame two wires crossing each other at an angle of about 30°; this microscope is shewn at I, fig. 1. In the two first micrometers a division of the head is of the value of about 0.2, and the power of diminishing 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-glass has a motion by hand, for producing distinct vision of the wire; and subject to the very great, as 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 measurement of the circle, and to reduce it agreeably thereto, 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 last 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 be
the greatest exactness, when, by raising or depressing the roller, its concentricate 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 fixed on the figure, have only the appearance of narrow lines; but looked at from above, they resemble the letter A. They are fasened to the main frame, as at W and Z, by short pillars, having also the other end of the angle secured in the same manner; Y is a fine conical steel point for marking the dots, and X is a feeler, whereby the point Y may be pressed down with an uniform force, which force may be adjusted, by bending the end of the bar just above the point, so as to make the dots of the proper size. The point Y yields most readily to a perpendicular 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 manner whether with perfect truth or not, as was laid respecting the divisions of the roller; precision in either is not to be expected, nor wished; but it is of some importance that they should all be 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 stationary 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, but as it differs 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 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 stand directly over the place which is designated for the beginning of the divisions. In this position of things, let the feeler X be pressed down, until its lower end comes in contact with the circle; this will carry down the point, and make the first impreffion, or primary dot, upon the circle; unclasp 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 coincidence complete; where again press upon the feeler for the second 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 bifife the first dot, and the one which should be 180° distant. 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 too forward or too backward, according to the number 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 same 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 perforations 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 22.5°, and the half differences of the parts of all the area of 45° measured and noted as before; thus descending by divisions to 11° 15', 5° 37', and 2° 48'. Half this last quantity is 1.5° small to allow the micrometers to be brought near enough; but let all have the desired effect if they are placed at that quantity and its half, i.e. 4° 45 15', in which case the examination, instead of being made at the next, will take place at the next division but one, to 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 supposed 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 micrometer 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 it being numbered is particularly 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 mistaking 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° distant 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 22.5°; the fifth of four lines, with a distance of 11° 15'; the sixth of eight lines, with a distance of 5° 37'; the seventh of sixteen lines, with a distance of 2° 48' 45"; 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° 13' 7".

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 c the apparent error.
error, taken from the table of half differences, of the dot under investigation; then is \( \frac{a + b}{2} + c \) = its real error.

But as this simple expression may not be so generally understood by working as I would wish, it may be necessary to say the same thing less concisely. If the real errors of the preceding 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 difference, 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 contrary, 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 second 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 8.9

**Example 3.**

Point 88°.6, or half point of the third quadrant.

Real error of the point 84°.4 of the third quadrant 21.0
Real error of the point 2°.8 of the fourth quadrant 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 half of the fourth quadrant.

Real error of the point 84°.4 of the fourth quadrant 21.6
Real error of the point 2°.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 numbering 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 arrangement 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 difference 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 shows 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 inserted. The last course of all is, however, an exception; for, as the examining microscopes could not be brought near enough to bifection 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 shown in the two last examples.

When the table of real errors is constructed, the other table, 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 recourse to, indeed not a figure should be destroyed until the work is done. Reflecting the angular value of the numbers 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 instance before me, 5 of them made no more than a second, it is not pretended that one of these parts was seen beyond a doubt being scarcely 1/55 of an inch, much less the tenths, as exhibited in the table; 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 250 small round dots; and the second in finding the errors of those 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, to 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 instrument 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 corresponding 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 important purpose of reducing the biforced points to the usual division of the circle. This sector is represented in full dimensions by fig. 2; it is formed of thin brads, and centered upon the axis at A, in contact with the upper surface of the roller; it is capable of being moved round by hand; but by its friction upon the axis, and its pressure 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 færem 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 sector; while, or 22° 30′; but this does not repre-
fent any number of equal parts upon the instrument, whose
sub-divisions are to be 5' each; for \( \frac{2}{3}124'22\text{''}5 \) is exactly
16', 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 sub-
divided into eight parts of 10' each, as in fig. 6; we shall
then have a scale, which furnishes the means for making the
tru divisions, and an intermediate examination at every
bifectral 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 adjust-
ment also any undue run in the action of the roller may be
reduced to an insensible quantity.

When the utmost degree of accuracy is required, I give
the preference to dividing by lines, because they are made
with a left 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 crookedned's
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 neatness required, I have used dots; and
I have done so because I know that when a dot, and the wire
which is to bifect it, are in due proportion to each other,
the wire covering about two-thirds of the dot, the nicest
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 distinguish their 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 in-
flexible 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.
Ramsden, (See Engine for dividing,) 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 ad-
justing screw may be able to run it through a whole interval.
The microscope \( H \) must be firmly fixed by its two pillars
\( h, k \) to the main frame, with its micrometer head at \( z e r o \),
and with its only wire in the line of the radius, bifecting the
first of the 256 dots. And it should be observed that the
cutting frame and this must not vary reflecting 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 un-
varied, while the divisions of the sector past once under its
notice, for it must have its wires adjusted aforesaid to these
divisions at every distinct course. The microscope I has
two wires, crossing each other at an angle of about 403;
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 shown by
H, the sector must have moved through exactly 16° 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 per-
manence 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 slow 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 \( = 1 \text{''} 20' \); now
the apparatus wants to be carried further, to the amount of
16° of a division, before an interval is complete, but at this
point no 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 in-
terval, 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
micrometer head. The range of the screw for slow motion
must now be restored, the cross wires of \( H \) set back to
\(-4.8 \) divisions, and the sector moved back by hand, but not
to the division 0, where it began before; for, as it left off in
the first interval at 16° of a division, it has to go forwards 5th
more before it will arrive at the spot where the 17th divi-
sion of the instrument 1° 25' is to be made, so that in this
second course it must begin at 5th short 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 1. 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 \(-\text{Ist} \) part of the circle
11° 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 \( z e r o \), on the dot from which it set out; and the sec-
tor, with its 16th division, coinciding with the wires of its
microscope.
### GRADUATION.

#### Table of Apparent Errors.

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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 Ramdlen's demands, and is applicable to a quadrant 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 secteur; 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 secteur 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 if alone is employed in ascertaining the measure of the arcs divided; on which account this method is called dividing by the eye; which appellation, indeed, might have been given to the duce de Chaulnes' 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 conical 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 microscope 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-dividing any arc of a circle, but that bisection, trisection, and quinquefsection, may all be performed by vision 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 Astronomical 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 shake, but notwithstanding to have the power of sliding smoothly round the circumference to any given point, to which it may be adjusted by a flow motion, and there clamped; let \( d \) be a beam-compas, having its cutting point adjustable near \( b \), and let \( m \) be a microscope with two parallel hairs, one fixed, and the other movable 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 of \( d m \) may lie in the direction of the chord of half the arc to be bisectioned, when bisection is used, in which case the whole length from \( d \) to \( b \) must be very nearly equal to the whole chord of the said arc, and then both the centre of the field of view of \( b \), 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 \( d b \), 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 demitted low enough to make a stroke. Suppose now \( F \) and \( f \) to be the extreme points of an arc to be bisectioned somewhere near \( e \); after having placed the microscope at \( e \) or near the middle of the beam, with respect to the two points \( d \) and \( b \), and fixed the point on the refting place of \( d \), slide the frame till the fixed hair in the center, which must be exactly perpendicular to the line \( d \) in \( b \), intersects the circle at \( F \); then, lowering the point \( b \) from its prop, make a faint scratch; in the next place turn the beam-compas a little raised at the end \( b \), round its centre \( d \), till it 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 \( d b \). It is not proposed to make a dot between these two strokes, but to bisection the space between with the hair, by the eye, or, if necessary, by the movable hair of the microscope, after it has measured the whole of this space; the bisection line being now the true line of \( f \), which we suppose brought back to the microscope at \( e \), this intersection is the extreme point of the bisectional arc \( F \) or \( f \), which must be bisectioned successively in like manner, when the point \( e \) has been adjusted. When the arcs become small, a crooked point is proposed to be used at \( e \), that it may not be in the way of the microscope; or otherwise, if that plan will not succeed, to adopt what he calls Mr. Troughton's method of bisection an odd number of contiguous divisons, which was also done, as we have seen, by the duce de Chaulnes 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 \( d \) may now be a tangent to the circle at the cutting point.

If the whole circle could be graduated by continual bisection, this account is all that would be necessary for explaining the method of dividing here proposed, but, as trisection and quinquefsection are necessarily introduced, either before or after bisection, where the computation of chords is rejected, we must give also an account of these processes, which we believe are original. Suppose the arc \( a \), in fig. 5., to be proposed for quinquefsection, the equal measures \( a, f, e, d, b, \) and \( a \), are laid down in succession, by bringing \( a \) to the microscope, and making \( f \) nearly one-fifth of the whole, then by bringing up \( f \) to the microscope, and marking \( e \), &c. in the same way, beginning at \( e \), the points \( b, a, f, e, d, b, \) and \( a \), are made with the fame extent, which it appears was with too small an opening. Now the true point of the first quinquefsection from \( a \) will be between \( e \) and \( a \), and distant from \( a \) just one-fifth of the differential space \( d \); and the second point will be two-fifths of \( d \) from \( d \), 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 bisection the scratch before covered by it, and then the dividing line may be cut; in the same way allowance may be made for \( a \) this of the small space \( d \), before a second dividing stroke is made;
GRADUATION.

or, which gives left trouble, when the first quinquennating 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 that may arise, first, from placing the intermediate point, and again, of sub-dividing from it. A third method for quinquenfections or trifecions is hastily proposed, but is considered inferior to the former plans, and therefore may be paffed 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 affections 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 sweeps 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 bisectioned arcs will not be more affected by change of temperature probably than by Bird's method, but the quinquenfections or trifecions may be sensibly affected, as some time must necessarily be taken up in ascertaining the measures by vision, 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 nine points, or rather lines, 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. F.R.S., Lowndes's professor of astronomy in the University of Cambridge, addressed a paper to 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 expressions, that might puzzle the ordinary reader: two microscopes were adapted by frame-work, so as to be capable of examination 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 30°, 60°, or 45°, &c. and any of the following multiples of that are taken in succession; consequently, if all the said differences marked + or -, 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 be long to it, and must be allowed 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 practiced by all the best instrument-makers in the final adjustment of the divisions, and that too by means of micrometrical microscopes; for 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 procures 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 stationery 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 predilection as it was when the table was constructed.

Mr. Troughton, who is engaged with the construction of his fixed-circle for the Royal Observatory, intends, we understand, to adopt the use of four microscopic readings, two opposite each other, which will correct for eccentricity simply considered, 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 CIRCLE, 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 93 seconds." This is stated 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, searching it to preserve its figure unaltered after examination. In another part of the paper before us, the author says, "we may likewise observe, that the examination we shall not only be secured against the errors of division, but against those which arise from bad centering, 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 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; seeing 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 quadrant arcs will be greater than those subtended by the second and third; but if the line from zero to the centre of motion should pass through the centre of the divided circle, then the angles subtended by the first and second quadrant arcs will be greater than those subtended by the third and fourth. When, however, the microscopes have a cross 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 between the due de Chaulme'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 known facts pass unnoticed between the apparatus employed by Mr. Lax, and that for the purpose of examining standard measures, described by Sir Geo. Shuckburgh (Phil. Trans. 1758); but Mr. Troughton, we know, acquires the learned professor of borrowing any thing from him.

In the spring of 1810, Mr. James Allan, of Blewitt's Buildings, Petter 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 frets, &c., which would have been described most 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 method of Mr. Allan's method of racking, consists in its enabling a bad divider of a circle to correct his divisions, by what he calls a self-correction process. The contrivance is this: the usual wheel or circular plate that is raked, has a brass rim of about two inches breadth, and of the same diameter and thickness as the wheel, rabbeded over it, so as to appear as a part of the same wheel; four steady pins, at the exact distance of a quadrant from each other, keep the rim in its place by the aid of several equi-distant screws, and the rim will therefore admit of four positions on the wheel. When the wheel and rim together have been faintly raked in the usual way (see Engine by Rawsthorn) 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 equi-distant 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 professes to be placed so as to admit of reverting in position, and unless the steady 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 steady 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 truly 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 desired 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-correction, 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 smallness 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 therim, will correct each other, provided they are of similar quantity, and the rim will produce its desired 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 steady pins, however carefully fixed; for steady 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 allronomical instruments, it may, perhaps, seem superfluous to give a further account of the methods that geometrical 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 Mochneni, 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 practicality 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 \( \overarc{AB} \) into three equal parts, \( \overarc{CA} \) being the radius, and \( \overarc{C} \) the centre of the arc. Bisect \( \overarc{AB} \), fig. 1. of Plate XXI. of Astronomical Instruments, in \( \overarc{K} \), draw the two radii \( \overarc{CK}, \overarc{CB} \), and the chord \( \overarc{AB} \); produce \( \overarc{AB} \) at pleasure, and make \( \overarc{BL} = \overarc{AB} \); bisect \( \overarc{AC} \) at \( \overarc{G} \); then a rule on \( \overarc{G} \) and \( \overarc{L} \) will cut \( \overarc{CB} \) in \( \overarc{E} \), and \( \overarc{BE} \) will be \( \frac{1}{3} \) and \( \overarc{CE} \) \( \frac{2}{3} \) of the radius \( \overarc{CB} \); on \( \overarc{CB} \) with \( \overarc{CE} \), describe the arc \( \overarc{E} \); lastly, let off the extent \( \overarc{E} \) or \( \overarc{E} \) from \( \overarc{B} \) to \( \overarc{a} \), and from \( \overarc{a} \) to \( \overarc{b} \), and the arc \( \overarc{K} \) will be divided into three equal parts.

Corollary. — Hence, having a sextant, quadrant, &c. accurately divided, \( \frac{1}{3} \) the chord of any arc let off upon any other arc of \( \frac{1}{4} \) that radius will cut off an arc similar to the first, and containing the name number of degrees. Also, \( \frac{1}{3} \), \( \frac{1}{4} \), \( \frac{1}{5} \), &c. of a larger chord will exactly cut similar arcs on a circle whose radius is \( \frac{1}{3} \), \( \frac{1}{4} \), \( \frac{1}{5} \), &c. of the radius of the first arc.

Example 2. — Let it be required to divide the arc \( \overarc{AB} \), of the fame figure, into five equal parts, or to find \( \frac{1}{5} \) of the arc \( \overarc{AB} \).

Having bisected the given arc \( \overarc{AB} \) in \( \overarc{K} \), and drawn the three radii \( \overarc{CA}, \overarc{CK}, \overarc{CB} \), with radius \( \overarc{C} \) I describe the arc \( \overarc{I} \), which will be bisected in \( n \) by the line \( \overarc{K} \); then take the extent \( \overarc{I} \), or its equal \( \overarc{M} \), and set it off twice from \( \overarc{A} \) to \( \overarc{B} \); that is, first from \( \overarc{A} \) to \( \overarc{a} \), and then from \( \overarc{a} \) to \( \overarc{b} \), and \( \overarc{a} \) will be \( \frac{1}{5} \) of the arc \( \overarc{AB} \). Again, let off the same extent from \( \overarc{B} \) to \( \overarc{m} \), and from \( \overarc{m} \) to \( \overarc{e} \), and the the arc \( \overarc{AB} \) will be accurately divided into five equal parts.

Example 3. — To divide the given arc \( \overarc{AB} \) into seven equal parts. \( \overarc{AB} \) being bisected as before, and the radii \( \overarc{CA}, \overarc{CK}, \overarc{CB} \), drawn, find (by a problem referred to) the seventh part \( \overarc{P} \) of the radius \( \overarc{CB} \), and with the radius \( \overarc{CP} \) describe the arc \( \overarc{P} \); then set off the extent \( \overarc{P} \) twice from \( \overarc{A} \) to \( \overarc{J} \), and from \( \overarc{J} \) to \( \overarc{6} \), and \( \overarc{6} \) will be the seventh part of the given arc \( \overarc{AB} \); the compass being kept to the same opening \( \overarc{P} \), set it from \( \overarc{B} \) to \( \overarc{d} \), and from \( \overarc{d} \) to \( \overarc{c} \), and from \( \overarc{c} \) to \( \overarc{e} \); then the extent \( \overarc{A} \) will bisect \( \overarc{13} \) into \( \overarc{2} \) and \( \overarc{46} \) into \( \overarc{5} \); 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 say 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 \( \overarc{AB} \), 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 \( \overarc{AB} \), and let 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 \( \overarc{C}, \overarc{D}, \overarc{E}, \overarc{F}, \text{and} \overarc{G} \). Divide now the whole line \( \overarc{AG} \) into as many equal parts as are required in \( \overarc{AB} \); as \( \overarc{G}, \overarc{H}, \overarc{I}, \overarc{K}, \overarc{L}, \overarc{I} \), each of which contains the given line, and one of those parts into which the given line is to be divided. For \( \overarc{AG} \) is to \( \overarc{AL} \), as \( \overarc{AF} \) to \( \overarc{AB} \); in other words, \( \overarc{AL} \) is contained five times in \( \overarc{AG} \), as \( \overarc{AB} \) is in \( \overarc{AF} \); therefore, since \( \overarc{AG} \) contains \( \overarc{AF} \), and \( \overarc{4} \) and \( \overarc{5} \) of \( \overarc{AB} \), then \( \overarc{AB} \) into \( \overarc{5} \) the 14th of \( \overarc{A} \). Then, as \( \overarc{GH} \) contains \( \overarc{AB} \), plus \( \overarc{FH} \), which is \( \overarc{4} \) of \( \overarc{AB} \), \( \overarc{F} \) will be the 14th of \( \overarc{A} \). Hence, if we set off the interval \( \overarc{GH} \) from \( \overarc{F} \) and \( \overarc{H} \), we obtain two parts between \( F \) and \( I \); the fame interval, or extent, let off from these two points near \( I \), gives three parts between \( D \) and \( K \); when let off from the points from \( D \) to \( K \), it gives four parts in \( C \); and the next transfer will, from those points, give five parts from \( B \) to \( A \); so that, lastly, the fame extent will give back again the remaining divisions in succession from those between \( B \) and \( C \).

This method is liable to some of the fame sources of error as the preceding method, when compasses alone are depended on; but it is useful, according to the due de Chateline's mode of proceeding, and may be serviceable in Ramsden's method of dividing, where the points are rectified by opposite microscopes. In all probability the vernier scale owes its origin to this problem of Clavius, which problem may be variously described, 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 begin with should not alter during the whole process, and also that the points, once marked, should be capable of being resumed 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 \( \overarc{AB} \) to be measured, or otherwise known previously to the proposed sub-division.

When an entire circle is proposed to be divided into degrees, the radius, which is equal to the chord of 60°, affords the means of making six equal arcs; and these arcs may be sub-divided to arcs of 15° 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. Carette, 1758; and is contained in the second book of his "Geometrie 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, one without and two within the circle, afford the means of taking 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 coil is attached to radial bars, and forme a wheel for the body of the instrument, which construction contributes equally to greater strength and lightness; a
Graduation.

that sheet of metal, which the present method of dividing requires, is seldom, if ever, adopted in the construction of an instrument of considerable radius. The second book of the "Geometry of the Compasses," which has not yet been translated into English, and which therefore may not be known to many of our readers, contains ten problems on the division of the circumference of a circle, and one on the manner of bisecting an arc by a new process, that makes no superfluous marks, and requires no second trial: these problems are accompanied by demonstrations and corollaries, that would enlarge our article too much, were we to transcribe them entirely, but we will give much of the substance of these problems, as will enable the reader to comprehend the nature and extent of the division in question, which we apprehend will be deemed more curious than useful.

The ten problems divide the circle into the following parts, according to the order in which they are treated one another, viz. 1. 8, 12, 24, 48, 5, 10, 120, 20, and 240. Let fig. 3, of Plate XXI, be a diagram for illustrating the four first divisions or problems. Let one beam, or other kind of compass, describe the circle with the extent B A from the centre A, and let this compass have its extent preferred unaltered, to represent the radius, and be called the first compass; with this extent and beginning at B, as zero, turn over to C, D, E, d, e, and back to B again; if this is accurately done, B A E will bisect the circle, B D d will trisect it, and the fix original points will divide it into five arcs of 60° each; take now B D, the chord of 120° in the second compass, and preserve this extent unaltered; from zero B and its opposite point E, bisect the point a out of the circle, with this extent; then will the distance a A, taken in a third compass, and kept unaltered, be the chord B F of 90°; also of the arc E F, of E f, and of f B; the circle is now divided into four quadrants at the points B, F, E, and f. To obtain an eighth part of the circumference, set A B, by the compasses N ° 1, from the point a, out of the circle, to G and H in the arc on each side; then the semi-circle is divided into four, and the points g and h, in the other semi-circle, may be transferred from G to H, and from H to b, with the compasses N ° 3, or chord of 90°; and the whole circle will now be divided into eight equal arcs by the points B, O, G, E, H, f, E, and f.

To gain twelve equal arcs of the circle, with N ° 1, or extreme radius, and E a, the point a within the circle, is necessary: to avoid confusion from further sub-division, we will take another fig. (4) with familiar 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 O, and the arc B Q will be the fifth part of the circumference. To bisect these five large arcs, take the sixth 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 L, already marked, will be the 120th part of the circumference; and to subdivide the whole circumference by the small arc P 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 s, by stepping the points t, s, and t; thus shall the points P, R, and S sub-divide the arc N G into five equal arcs, and will be found equal P S, or 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 inference, into other arcs of 15° in succession, beginning with C G first, and using the points N, P, and C, as they occur, till the whole is gone through, after which the small arcs thus transferred may be bisected by an extent N N, going a second time over the same 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 B C (fig. 5) into two equal parts in G. To this: with radius A B, which has described the arc B C to be divided, and from the centres B and C, the two extremities of the arc, let the arcs A D and A E be described; let A D and A E be each made equal to B C; then from the points D and E, as centres, and with radius D C or E B, and by intersecing the point F; lastly, with the radius A F, and from the centres D and E, let the point G be interseced, which will fall in the circumference, if the operation is truly performed, and will also bisect the arc B C as was required.

By the help of the three remarkable points a, b, and h, in our fig. 4, the author of the Geometry of the Compasses, has laid down in his twelfth and last book a dozen equations, 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 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 I.

To find the arc of one degree without the error of half a second.

Solution.—Let the arc B = z, below B, be 55° 30′, (in the circle which has been divided into 240 parts of each 1° 30′), take the distance b = z; and from the point s, a centre, describe an arc to cut the circumference in some point Z, and the arc B Z, above B, will be 52° 59′ 17′′ or 53′′ within about 25′′; then in the divisions between B and F is the division...
division 54°, or $\frac{3}{4}$ of the whole circle; there will therefore be $54° - 53° = 1°$ by approximation within the required degree of accuracy.

Solution 2.—Let the arc $BZ$ be taken $= 10° 30'$, (by the divisions existing) from the centre $a$, and with the distance $bZ$ as radius, cross the circumference in the said point $Z' = 29° 29'54''$, or $29° 30'$ without an error of half a second; then look for $28° 30'$ in the existing divisions, viz. $\frac{3}{4}$ of the circle, and the difference will be very nearly as before $= 1°$. This solution is less accurate than the former by about $4''$; the error being $29''$.

**Problem II.**

*To find an arc of 15° without an error of 1°.*

**Solution.**—Take the arc $Bz = 12°$ below B, the distance $cz$ will be the chord of $87° 15'$, 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 $87° 15'$; but among the existing divisions of the arc is $87°$, or $\frac{5}{6}$th of the circumference; therefore, the difference of the two arcs is $= 1°$.

**Problem III.**

*To find an arc of 10° without an error of 10°.*

**Solution.**—Take the arc $BZ$ downward $= 49° 30'$, and the distance $bZ$ will be the chord of $38° 50'$, without an error of $10''$; then, the division $39°$, or $\frac{3}{4}$, being found already, their difference on the circumference taken from B upwards, will be an arc of $10°$.

**Problem IV.**

*To find an arc of $6'$ within $13''$.**

**Solution.**—Take the chord of $45°$ from B to G above, and from the point $b$ cut the circumference at $=\pi$, which will be at $40° 6', downwards from B, without an error of $13''$, but $40'$ counted downwards already exists, therefore the small arc between is $6'$. 

**Problem V.**

*To find an arc of $1'$ within $22''$.**

**Solution.**—Let $BZ$ downwards be $= 27°$; from the point $a$ as a centre with radius $bZ$, cut the circumference above at $Z$; and the arc $BZ$ will be $29° 59'$, with an excess of $22''$; therefore, the arc $BN$ being $30°$, the arc $ZN$ will be $1'$ within $22''$.

Byitch means as these an arc of $9''$ is determined; also, an arc of $20''$ within $1''$; an arc of $15''$ within $10''$; an arc of $12''$ within $1''$; an arc of $10''$ within $1''$; and an arc of $5''$ within $2''$; but these last arcs are so minute in all ordinary circles, that we omit the solutions, as being of no utility.

We have hitherto supposed the circle divided into $360°$ with their subdivisions, 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 subdivided by hundreds, &c. This mode of dividing has been exemplified by L. Mascheroni, in his Geometry of the Compas; 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 divider in affording biflections lower than $25°$, 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 lend our aid to the introduction of useless innovations, by entering more minutely into the subject.

L. Mascheroni is the Italian geometer, who informed, that taught Bonaparte 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 graduate, pass into, pass over to, or make transitions to, such minerals. Frequently, the first of the earth graduate thus into each other, so that it is extremely difficult to define where one mineral ends and another of very different properties begins; these graduations are not uncommon between some lime-dolomite and the chert beds in them. More frequently, each mineral is separated by a thin layer or way-board of pulverulent matter, which occasions the firstrate to part freely and, often, in such cases, the parts of the interface in contact with these way-boards differ nothing from the general mass of each mineral, or there is no graduation between one mineral 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 faggots, and expelling them in this divided state to a free current of air. See *Muriate of Soda.*

**Gradus Gemonic.** See *Gemonic.*

**GRÆA, Græa,** a name used by the old Greek writers for the wrinkled pellicle which arises upon milk in the boiling.

It was also used in a figurative sense for the wrinkles in the skin of old people.

**GRÆCIA, Greece,** 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 Greece and Græcia. The most prevalent opinion traces the origin of these terms to Graicus or Græus, the father, as some say, but, according to others, the son of Thebæus, who gave its name to Thessaly. Salmasius supposes the name Græus to be derived from Ragus or Rau, the son of Peleg, the fourth in descent from Jem, the son of Noah, by the transposition of a letter in order to soften the sound. Péron deduces it from Graia, signifying in Celtic ancient, and applicable to the Grecians by way of contradistinction to more modern people. But it has been objected to this etymology, that the Pelagiæ and Hellenæ were a more ancient people than the Greeks. M. de Gebelin supposes the origin of the appellation to have been the word rha, or rba, denoting vaft or immense, in reference to the sea which terminated the Adriatic gulf, on the borders of which the Greeks migrated southwards, whence he forms *Rhaus,* signifying this sea, and by prefixing the guttural G to the hylial R, *Græus.* The Greeks were also called Achæans, Helles, and Pelaïgæ. The first of these appellations is supposed to have been derived from Achæus, the son of Xuthus, the son of Helen, and father of Ion; the second from Hellen, just mentioned, the son of Deucalion, and father of Dorus, from whom sprang the Dorians, and the third, from a pretended founder Pelasgus, who, taking possession of the Peloponnesus, occasioned its being denominated Pelasgia. Grotius, Salmasius, and Stillingfleet,

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*Names*
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 fastened the name of Peleg, or Phaleg, their progenitor, and called them Pelasgians. But Bochart (in his "Phaleg") shews, that both Phaleg 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 Phaleg or Ragau. Some have asserted that the most ancient name of all is that of Iones, which the Greeks themselves derive from Xuthus, grandson to Dankalion. Josphus affirms (Ant. i. 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 adduces the authority of Josphus, just cited; he then appeals to the name of the patriarch, יי, which, without the points, sounds more properly Ion than Javan; he next alleges the authority of Moses, who says (Gen. x. 5.) that "by thee" (the sons of Japhet) "were the isles 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 Palestine, 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 Grecia by the name יי, Ion, or Javan, and hence the Jews have always called the Greek tongue יי, Javanish. To these arguments he adds that the clear remains of Eliish, Javan’s eldest son, are still to be found in that of Elys, one of the ancient kingdoms of the Peloponnesus.

Grecia, or Ancient Greece, Geography of. Exclusively of the provinces of Epirus and Macedonia, 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 gulfs, compressing between them a mountainous neck of land, to the breadth of only five miles, into the peninsula of Peloponnesus, and the territory extending northwards, 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 every where interfected 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 Elia and Messenia, which are throughout better adapted to tillage, than any other provinces of the Peloponnesus. The Grecian possessions beyond the isthmus of Corinth were more considerable, 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 Boeotia, 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 fecure 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 provinces 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 appealed, in adjusting 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-eminence. 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 states 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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<th>Peloponnesus</th>
<th>Terra Firma</th>
<th>Græcia Propria</th>
<th>Thessalia</th>
<th>Epirus</th>
<th>Illyria</th>
<th>Macedon</th>
<th>Islands</th>
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<td><strong>Elis</strong></td>
<td>T. Therse, Orcheanous, Cleonice, Tanagra, Eleuther.</td>
<td>T. Therme, Calydon, Chalitis.</td>
<td>T. Thermus, Calydon, Chalitis.</td>
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<td><strong>Achaia</strong></td>
<td>R. Cepheus.</td>
<td>R. Achelous, Evenus.</td>
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<td><strong>Corinthia</strong></td>
<td>T. Corinthus, Lechaum, Cenchrae.</td>
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<td><strong>Arcadia</strong></td>
<td>T. Megalopolis, Manila, Ticea, Orchestus, Phigalia.</td>
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**Islands**

- To the West.
  - Corcyra, Leucadia, Cephallenia, Dulichium, Zacynthur.
- To the South.
  - Cithara . . . Creta.
- To the East.
  - Theria, Naxia, Paros, Delos, Myconus, Tenos, Andros, CEOS,
  - Eurea, Seyros, Theras.
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; Paulyanias, who details the results of his own travels and observations; and Ptolemy, who furnishes an useful nomenclature of the states and chief towns, with their longitudes and latitudes.

**Greece, or Ancient Greece, by P. F.** The traditions of the Greeks (says the learned historian, Dr. Gillies) agree with the authentic records of sacred history in representing the countries afterwards known by the names of Thrace, Macedonia, and Greece, as peopled at an earlier period than any other portion of the western world. The southern corner of Europe, comprehended between the 35th 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 Helen, they derived their general appellation, which originally denoted a small tribe in Thessaly, and from Dorus, Eolus, and Ion, his more remote descendants, they were denominatet by the names of Dorians, Eolians, 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 less barren parts of Attica; and the Eolians peopled Elia and Arcadia, 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, feldom found in barbarians, who live by hunting or pasture, the latter, disdaining fixed habitations, wandered in large bodies over Greece, or transported themselves into the neighbouring 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 Hellepont; and in those widely separated countries, their ancient affinity was recognized in the uniformity of their rude dialect and barbarous manners, extremely disimilar 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., Paulyanias, Thucyddes, 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, Mothis, 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 Elia, Tharsis or Thrace, Ketim, and Dodanum; 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 Pelasgi 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 Thrarsis or Thrarsis for its founder; Ketim possessed the country of the Getae, N. of Macedonia, and Macedonia itself; Dodanum had the country that lay between Macedonia and the Peloponnesus, inhabited by the Dorians; and Elia designated the inhabitants of the Peloponnesus. This author, in so small a 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 fabk of the Argonauts and their voyage to Colchis is a copy of the navigation of Noah. Phryxus, or the “man favored,” 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 Helen, the reputed father of the Greeks, were the same persons; and that the Hellenes and Pelasgi were the same people.

According to this writer, the Pelasgi were the sole pollellers of the whole country which extended itself from the banks of the Danube, to the sea of the Peloponnesus; they peopled Thrace, Getia, Macedonia, Illyria, Epirus, Thessaly, the Phocide, Attica, and the Peloponnesus; they sent colonies to the isle of Crete, to Etruria, and to the south of Italy; and others crossed the Danube, and were designated Dacians and Getae. Greece was in this state, 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 Phœnicia, a neighbouring country. The first inhabitants of Greece, whencefore 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 eastern regions which were anciently most populous and flourishing, invited strangers first to visit, and afterwards to dwell among them. The Greeks were not insensible 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 surroundning 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 deities was introduced at the same time, and by the same person, who made known to them the arts most subservient to the purposes of human life.

From the middle of the 16th to the middle of the 14th century, B.C., the inundation of Egyptians, Phœnicians, 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 Phœnician, who founded Thebes in Boeotia; and Persepolis.
The invaders of Greece introduced many important and useful improvements. They brought into that country the knowledge of the Phenician alphabet; they diffused the operations of agriculture; they multiplied the rites of religion; discovered to them several uses of the metals; and, in return, adopted the Greek language, and generally conformed to the Greek customs and institutions. By the Phenicians 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 concur to retard its improvement.

The inhabitants of different parts of the country were unconnected on account of the greeks and rivers, as well as the mountains and promontories, that rendered Greece different from any other part of Europe. The Greek states were small; each city was at war with its neighbour, and want of union and mutual concurrence prevented their 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, Amazons, and other northern savages.

But these invasions and ravages of the barbarians occasioned the institution 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, viz. 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 disunited 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 CRETE.) Thus, each of the Cretans 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; and, insomuch, that at the commencement of the Trojan war, in 1193 B.C. all the Cretan states had adopted one uniform system of government, uniting the independent spirit of European freedom with the respectful veneration of Egyptian and Asiatic superstition.

Of the mythology and manners of the Greeks in the heroic ages, as well as their geography and history, Homer, whilst 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 sacerdote, which denoted the connexion of civil power with sacred protection, was conferred, among the Greeks, on those who, while they continued the humble ministers of the gods, were appointed to be the chief and accountable guardians of the people. The same voice (says Dr. Gillies) that summoned the warriors to arms, or that decided, in time of peace, their domestic connections, conducted the order of their religious worship, and prevailed 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 extensive, including the principal offices of life, and the nobler virtues of mankind. The useful quality of courage was peculiarly 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 Jove." The submission of subjects to their prince, the duty of a prince to preserve inviolate the rights of his subjects (Il. xvi. 585), the obedience of children to their parents, the respect of 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 more ordinary transactions of private life were consecrated by the piety of the Greeks. They ventured not to undertake a voyage, or a journey, without soliciting the propitiation of their heavenly protectors. Every meal (and they had three in a day, viz. morning, dinner, and supper), was accompanied with a sacrifice and libation. The common forms of politeness, the customary duties of civility, were not decided by the varying tastes of individuals, but defined by the precise voice of the gods. The laws of religion were guarded and enforced by corresponding sanctions. The dread and 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 tragedians 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 sprung. By the dint of light of etymology and tradition (says the ingenious historian of Greece), and the delectable glare of legend and fable, inquisitive men have endeavoured to trace the corrupted fires 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
the traditions of all nations, Greeks and Barbarians. (See Hefiod, Oper. and Di. v. 110, 165. Theog. v. 220, 725.) But our author observes, 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, whereon originally derived, it must have undergone a particular modification in the Grecian foil; nor (he says) is it easy to concur with the opinion of writers who bring it immediately from Egypt, Chaldea, or Letier Asia, when we consider that there is not the smallest vestige in Homer of the judicial artology which prevailed so much in the two first countries, (Diod. Sic. i. ii. Exod. ch. vi. Plin. li. xxv.), 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 terrors of superstition.

The great pillar of superstition, raised by the anxious passions of men, was fortified in Greece by a peculiar sensibility of character, which exerts itself in the adornment of social affection, and strengthens, by a thousand associations, their belief in invisible and intelligent powers. The nature, the characters, 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 unhappy 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 Gods.) 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 renement, the savage cruelty, and the fierce spirit of wild independence, which usually characterizes the manners of barbarians. Upon the whole, the ancient and venerable superstition of the Greeks was distinguished above all other false religions, by the uncommon merit of doing much good, without seeming occasioning any considerable harm to society. The Grecian tenets, while they inoculated 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 shown to the ceremonies of their national worship. In their imitation, the doing of injury to men, and the omission of prayer to the gods, were the principal caufes 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 oracles, the wild raptures of prophetic enthusiasm, the abominable ceremonies of the Bacchanalia, and the horrid practice of human sacrifices, all which are circumstances that cover with deferred infamy the latter periods of Paganism, were unknown to the good sense 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 lyftem communicated its beneficial influence to the civil and military institutions of the Greeks, to the laws of nations, as well as to the regulations of internal policy, and to the various duties of domestic as well as of social life.

In examining the political states of the Greeks, during the heroic age, we shall find that they defer the title of republics, rather than that of monarchies. The foldiers 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 distinction 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. 516.) This person, 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 solemnities. These 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 revolutions 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 prevauled 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 same 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 Grecian 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 presents 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 perfon might purchase immunity, but more frequently escaped death by voluntary banishment. It has been erroneously said, that, in ancient Greece, wives, as well as concubines, were the faves 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 practiced by ladies of the highest rank, and even by queens; and they were also en-
The Græcia.

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 transcribe 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 Græacas," says Dr. G., "had advanced beyond the age of rude barbarism, that uniform indolence of deportment, that fullness of facility, that perfect skill in matters, and that hardened insensibility of heart, which universally characterizes the savage state. They still preserved, however, that patient industry, 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 enjoyments of life, study and conversation, they were little acquainted, indeed, with the combinations and pleasures of the first, the want of which was compensated by the Socrety, the confidence, the charms of the second. Their local affections were less 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 consolations of interring the remains of his favourite son, till the corresponding image of his own father strikes his mind, and at once melts him to pity. (Ilid. xxiv.) The imaginary wants 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 Græacas by that excessive sensibility, which interceded them to 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 inanimate objects of nature. As they were not acquainted with the same diversity of employments, so neither were they fatigued with the same giddy round of dissipated pleasures which augment the splendour of infernal mirth. Though ignorant of innumerable acts which adorn the present age, they had discovered one of inestimable value, to render the great duties of life its most entertaining amusement. It will not, perhaps, be easy to point out a nation who united a more complete subordination to established authority with a higher sense 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 political 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 Græacas 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 1184 B.C.; the era of its commencement is not precisely ascertained, but it may be said, that it was commencing with the foundation of the kingdom of Crete by Androgeus in the year 2050 B.C., and continued for about 1000 years. The first was properly the infancy of Greece; and comprehended the establishment of the kingdom of Sicily, of Argos, 1596 B.C. of Athens, 1596 B.C. of Troy, 1546 B.C. of Thebes, 1492 B.C. of Mycenae, 1444 B.C. the decline of Ogyges, 1764 B.C. and that of Deucalion, 1523 B.C.;
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, 1466 B.C.; the Argonautic expedition, 1263 B.C.; the exploits of Theseus, 1234 B.C.; the war of the seven heroes against Thebes, 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 604 years. In the year 1184 B.C., 80 years after the taking of Troy, the Heracleids, or descendants of Hercules, conducted the Dorians to the eastern coast of Peloponnesus, and having landed their followers without opposition, afforded the defencelst 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 Heracleids divided their new acquisitions by lot. Upon the division of Peloponnesus the kingdom of Lacedaemon commenced, 1102 B.C. In the year 1056 B.C., or 88 years after the taking of Troy, the Eladians, 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 1024 B.C., 60 years after the return of the Heracleids, the Ionians, blended with other emigrants, having feized the central and most beautiful part of the Asiatic coast, gradually diffused their colonies from the banks of the Hermus to the promontory of Pindus, 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 Doris.)

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, inspired by ambition and avarice, they transgressed the prescribed limits, and trampled on those laws which their predeccessors 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 jealous of their encroachments, and induced them to reft their oppressions. 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. Miltus, the fourth Argive prince in succession to Temenus, to whom Argos fell on the Heraclean distribution, was condemned to death for usurping absolute power. In Attica monarchy more honourably expired; it perished still more disgracefully in Arcadia; but it 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, 725 B.C.; and which tended to the safety of their respective territories, though in different ways; the Olympic games by rendering Elis the most pacific, and the laws of Lycurgus by making Sparta the most warlike, of all the Greek 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 Messenians was the only war of that age which produced permanent effects. Of Laconia and Messenia 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 Messenian frontier and attack the small town of Amphiata; and thus in the year 713 B.C. began the first war between the Messenians 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 Messenians prepare to revolt, and a second war commences, which continued 14 years, and ended with the capture of Ira, or Iera, by the Lacedaemonians, after a siege of 11 years. The conquest of Messenia rendered Sparta the most considerable power in Greece, as its subjects occupied two-fifths of the Peloponnesus. In the year B.C. 660 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 Greek 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, augmented their navy; and under his command they defeated the fleets of Erechthe and Coregyra. 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 defined to flow over Europe, from becoming a province of the Persian empire, and being confounded with the mafs of barbarous nations. Xerxes was provided
provided with 1200 ships of war, and 3000 ships of burden, for his intended expedition: and his army consisted of seventeen hundred thousand infantry, and four hundred thousand cavalry, and these, joined to those who manned his fleet, amounted to near two millions of fighting men. In the year 480 B.C. he passed the Hellespont, and the vain-glorious monarch had the pleasure of reviewing the whole fleet and army near Doricus, a city of Thrace, at the mouth of the river Hebrus. In the mean while these Grecians, who, unmoved by the terrors of invasion, obeyed the voice of liberty and their country, had sent deputies to the inhabitants 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 Artemisium, patiently expecting the arrival of the barbarians. The frigates of Thermopyla, 15 miles distant from the station of the Grecian fleet at Artemisium, and deemed the gate or entrance into Greece, was guarded by troops, confiding chiefly of Peloponnesians, under the command of Leonidas, the Spartan king. Xerxes having made his previous arrangements, sent messengers to treat with the Spartans, and to declare to them the manner of their coming, and to offer on condition of their becoming allies to the great king, but they answered, "Let him come and take them." The messengers then offered 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 valor, 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 repulsed; it was renewed the next day with the like effect.

The Greeks, however, were betrayed by Epiphanes, a pernicious wretch of their own nation, who conducted a body of twenty thousand Persians through a passage in the mountains of Octa, several miles to the west of that guarded by Leonidas. The Athenian general had prudently guarded this important but unknown pass, 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 instantly flew to their arms, and determined to repel the proffers of the enemy or to die in the attempt. Expecting to be purfued, they retired to the highest part of the mountain; but the Persians, declining to follow them, seized the passage which they had abandoned, and marched down the mountain in order to accomplish the design which had been preconcerted by the traitor Epiphanes. Leonidas, apprized of this act of treachery, called a council of war; when all the commanders of Peloponnesus, except the Spartans, determined to abandon a post which they deemed to be untenable. Leonidas, however, with 700 Thessalians, 400 Thebans, and 300 Spartans, remained in the post of danger and of glory. In the dead of night the Spartans, headed by Leonidas, marched in a close battalion towards the Persian camp, with resolution heightened by despair. The conflict was ardent and destructive, till 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 frigates of Thermopylae. The shock was dreadful; and the battle was maintained on the side of the Greeks with pernicious treachery and deliberate slaughter. At length a barbarian dart pierced the heart of Leonidas; nevertheless, the Lacedemonians and Thessalians, though ingloriously defeated by the Thebans, maintained their firmness to the last; and they were finally not destroyed 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 Artemisium, the northern promontory of Euboea, and the numerous one of the Persians had anchored on the road that extends between the city of Carthage and the promontory of Capo, on the coast of Thrace. Here it suffered calamities, of which Xerxes had been forewarned, but which he disregarded. Themistocles, by his address, prevailed on the Athenian commander to remain at Artemisium; 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 result of which see Artemisium. The Persians were again totally defeated near Salamis (which see); 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 Platea, see Plataea. The event of this bloody engagement not only delivered the Greeks from the danger of servitude, but gave them possession of greater wealth than they ever before had expected to possess. In his precipitate retreat from Greece, Xerxes left behind him all his riches and magnificence. The battle of Platea was succeeded by that of Mycale, in which the Greeks were again victors. About 45,000 Persians perished in the field, many fell in the pursuit, and the remainder fled in disorder, nor thought themselves secure till they had reached the walls of Sardis. Their ships, their camp, the freedom of Ionia, and the undisputed possession of the Asiatic coast, formed the inestimable prize of the victors; and thus the expedition of Xerxes, undertaken 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 single lifetime of Pericles, the republic of Athens produced those inestimable models of poetry, eloquence, and philosophy, which, in every succeeding age, the enlightened passions of mankind hath invariably regarded as the best standards, not merely of competition and style, but of taste and reason. The name of Greece seemed thenceforth to be sunk in that of Athenian. (See Athens, and Sparta.) For an abstract of the further history of this period of Alexander's victory and empire, we have given a brief sketch under his article; we shall here observe, with Dr. Gilly, that during the later years of his reign the Greeks, deprived of the honour and delivered also from the cares of independent sovereignty, and undisturbed by their continual and often bloody dissensions, which deform the annals of their tumultuous liberty, 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 success. Many improvements were made in the sciences, and the Greeks, particularly the Athenians, still rivalled the Intellect and genius, though not the spirit and virtue, of their ancestors. Yet even in this degenerate state, when patriotism and true valour were extinct, and the vanquished republicans had neither liberties to love, nor country to defend, their
martial honours were revived, and brightened by an association with the renown of their conqueror. Under Alexander, their exploits, though directed to very different purposes, equalled, perhaps excelled, the boastful victories of Marathon and Plataea. By a singularity peculiar to their fortune, the era of their political dignity coincides with the most splendid period of their military glory. Alexander was himself a Greek; his kingdom had been founded by a Greek colony; and to revenge the wrongs of his nation, he undertook and accomplished the most extraordinary enterprises 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 Achaea, comprehends an interval of 177 years. After various changes and revolutions, for an account of which, see Achaeans and Athens, it became subject to the Turks.

**Greece.**

A name given to the southern part of Italy, comprehending Apulia, Lucania, and the country of the Bruttii, and also to Sicily and several of the adjacent islands. The name of Grecia was derived from the Greek colonies, which migrated hither at different periods, and the epithet magna, or great, was derived from mere ostentation, as Pliny informs us (l. i. c. 5). This migration and settlement 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 restless spirit of adventure and rapine, occupied the isles of the Ionian and Ægean seas, the southern coast of Italy almost interjected by the former, and the winding shores of Asia Minor so beautifully diversified by the latter. The larger islands of Sicily, Sardinia, and Cyprus were very anciently planted by Greeks.

Whoever has observed the delineate barbarity of Calabria, or reflected on the narrow extent and pestilence weakness of Sicily, will fearfully believe, that five centuries B.C. those countries contained above 20 warlike communities, factional of whom could lend 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 Chaldæan to their new settlements; 2. By the Achæans of Peloponnesus, who were of the Æolian tongue and lineage; and 3. By the Dorians of that peninsula, especially Corinth. Besides their powerful colonies in Corecyra, Lacedæmon, Arcadian, Anibarea, whose observations form such an important part of the history of ancient Greece, the Corecyraeans founded Syracusae, which soon became, and long continued, the capital of Sicily; and in the sixth century B.C. the Syracusans 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 acquired, and always maintained, an ascendant in Sicily; but the Achæan colonies, who were of the Æolian blood and language, commanded the Italian shore. Crotona, the most considerable city of the Achæans, 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 Troas, Cephallenia, and Pandemia; the latter built Laxis, Metapontum, and Pothonia, or Paullum, 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 Eubœa, and settled chiefly near the cælar shore of Sicily, never rivalled the power and fame of their Dorian and Æolian neighbours, but fell short of those nations in Magna Graecia, as much as they surpassed them on 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 adduced, 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 particularly of Sicily, which in many places produced an hundred fold; and in this connexion observe, that the Greeks who failed thither from Peloponnesus, carried with them the knowledge and practice of agriculture which had already attained a high degree of perfection in their peninsula; 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 granary of Rome. Besides, the peculiar situation of the Achæans and Dorians, from whom chiefly the colonies in Magna Graecia derived their origin, had a considerable influence in accelerating the population and grandeur of these new establishments. The impartial and generous spirit of the Achæan 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 community 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 least worthy of consideration. The Dorian states of Peloponnesus were then universally subject to the gentle government of limited but hereditary princes, or to magistrates chosen from the descendants of their ancient royal families; and who, thus adorned by birth, were sometimes still more ennobled by wisdom and virtue. Moreover, the colonies in Magna Graecia, enjoying a wide extent of territory before them, were not retarded in their advancement by interference of interloc on the part of neighbouring states, but they found sufficient employment in subduing the original inhabitants of that country, without commencing hostilities either with the neighbours of agriculture or war. The kings or nobility of Magna Graecia, secure of their own importance, felt nothing of the republican jealousies which prevailed in the mother country. They received with pleasure new citizens, or rather subjects, from whatever quarter they might come. The states of Italy and Sicily, thus increasing by degrees, could soon boast, the former of Corecyra, Taranto, Sybaris, Rhegium; the latter of Syracuse, Agrigentum, Metapontum, Himera, and several other cities, which rivalled or surpassed the wealth of Athens or Corinth, and the poplufulness of Thebes, Argos, or Sparta. The wars, conquests, or oppressions, and, above all, the civil divisions, which in the sixth century B.C. disturbed and deformed the coast of Æolia, and the other Greek colonies in the islands and continent of Asia, brought frequent acceditions of inhabitants to the shores of Magna Graecia. Nevertheless, the Ionians, along with their poetry, music, and painting, communicated also their diffusive and artistic appettites to the Greeks of Italy and Sicily. It is a fact, however, that Magna Graecia, having obtained emolument by industry, diffipated it in idleness and licentiousness: insomuch that the Greek cities of Italy, and particularly Sybaris and Crotona, fell
GRAEONIUS, Julius, in Biography, a Roman senator, who flourished in the reign of Caligula, was son of a Roman knight, and greatly distinguished for eloquence, and for the study of philosophy, and he carried into practice the moral lessons which his studies led him to contemplate. He refused to obey the command of the emperor to appear as the accuser of Marcus Silius, and suffered death in consequence. Sueton says of him, that he was put to death for the sole reason, that he was too good a man to be permitted to live under a tyrant. He is mentioned by Columella, as having written a treatise concerning agriculture and the management of vines. He was the father of the illustrious Cn. Julius Agricola. Univer. Hill.

GRAEDER FORD, in Geography, a bay of West Greenland. N. lat. 63° 50'. W. long. 49° 30'.

GRAEMSDAY, one of the Orkneys, a flat, fertile island, 14 miles in length, and a mile in breadth, containing 32 families and 175 inhabitants; 10 miles S. of Stromness, near the northern extremity of Hoy. The soil of the interior part is thin and fertile; but the coast is a chain of broken and pointed rocks. It contains a bed of flint, but no fuel.

GRAEN, a town of Hindoostan, in Vifapour; 24 miles S. of Curner.

GRAENSATZ, a town of Croatia; 30 miles S. of Bihaç.

GRAEVUS, JOHN-GEORGE, in Biography, an eminent critic; was born at Naumburg, in Saxony, in 1632. Having acquired a good knowledge of the learned languages in Germany, he went to Leipsic and Rudolph under Ruminus and Strachius. After this he passed two years at Deventer, intimately connected with the celebrated Gronovius, to whom he acknowledged himself indebted for a considerable part of his acquisitions, and whom he after succeeded in his professorhip. (See Gronovius.) His great reputation induced the States of Utrecht to invite him to their university, and during forty-one years he instructed the young men there in politics, history, and eloquence, refuting various invitations to other seminaries. He died in the year 1703, at the age of seventy-one. He was the editor of many of our best classical authors, as Heid, the greater part of the works of Cicero, Florus, Cæsar, Suer-
sue, 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 fort of planting; the shoot or scion rather taking root in the fock 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-rock; which it is supposed depends upon some difference in the veils of the shoot or scion from those of the fock or tree.

**Grafting**, the act of inferring a shoot or scion taken from one tree, into the flem 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 fock or tree on which they are grafted may be; as notwithstanding the grafts receive their nourishment from the focks, 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 focks 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 progress as they otherwise would do, or 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 more 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 these 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 growing different kinds of fruits and flowers of the same fort, in the same fock 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 set in a fort of circle or crown, upon the top of the cut-off item or branch.

It is chiefly practiced upon large trees, when either the head or the large branches are cut off horizontally, and two or more flocks or scions put in, according to the size of the branch or item; in performing which, the scions are cut flat on one side, with a shoulder to rest upon the crown of the fock; then the rind of the fock is raised up, to admit them between the wood and the bark of the fock, which must be inferted about two inches, so as the shoulders may meet, and closely join the crown of the fock; and after the whole of the flocks or scions are inferted, all the crown of the fock should be well clayed 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 successes with which it has been attended; for, as the scions are placed between the rind of the fock 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 practiced, there should therefore always be some stakes fixed, so as to support the scions until they have almost covered the fock 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, Clift, or Slit-Grafting.**—This is a mode which is practiced upon focks, 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 fock is not too thick, by which the inner bark of the scion will be prevented from joining to that of the fock. In performing it the head of the fock or branch must be cut off with a fnbsp; or a fnbsp; be made the contrary way, in the top of the fock, deep enough to receive the scion, which should be cut slooping like a wedge, so as to fit the slit made in the fock; care being 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 fock, great care must be taken to join the rind of the scion exactly to that of the fock; for if these do not unite perfectly, the grafts will not succeed: when this method of grafting is used to focks that are not strong, it will be proper to make a ligature of bals, to prevent the slit of the fock from opening: after which the whole should be clayed 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 focks, or branches of an inch, half an inch, or less, as the scions much fcover the focks in this method, than in the other. It is performed by cutting off the heads of the focks flopping; then making a notch in the fock towards the upper part downwards, a little more than half an inch deep, to receive the scion, which must be cut with the fock upward, and a slit made in this fock like a tongue, which tongue must be inferted into the slit made in the fock of the fock, and the scion be placed on one side of the fock, so as that the two rinds of the scion and fock may be equal, and join together exactly; after which, there should be a ligature of bals put round to felen the scion, so as that it may not be easily displaced, the whole being afterwards clayed over as in the former methods. It may be performed in the early spring, months, with most success.

There are besides these, some other modes of performing the lumps.

**Grafting by Approach, or Inarch-Grafting.**—This is sometimes called ablation. It is performed where the focks that are designed to be grafted, and the trees from which the graft is to be taken, stand so near together, as that their branches may be bent and united. It is most commonly practiced on hardy exotic plants, and some other forts which do not succeed in any of the other methods. In performing the work, a part of the fock or branch is slit off about two inches in length, a smooth part of the fock being always chosen for the purpose; 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 fame manner as the fock, and a slit made upward in it, so as to have a tongue, which tongue should be inferted into the slit of the fock, joining their rinds equally, that they may unite well together; after which a ligature of bals should be made, so as to keep them exactly in their situation, and afterwards this part of the fock clayed over well 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 flock or branch, which is grafted, cut off till the same time, and only half the wood pared off with a slope, about three inches in length, and the name of the scion or graft. But in this method of grafting, the operation is not performed so early in the season as the others; it being done in the month of April, when the sap is flowing, at which time the scion and stock will join together, and unite much sooner than at any other season or period of the year. It is principally employed in raising jamiines, oranges, and other exotic trees of the harder 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.

Post-Grafting.—This, which is a late improved mode, is performed by cutting the smooth roots of the stocks in pieces of five or six inches long, and as large, or a little larger, than the grafts; then they are whin-grafted, and tied together very close, so as to prevent the wet from affecting 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, whences the grafts are taken; and after two or three years, the stock 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 best to defer it till the circulation of the sap is brisk, and the buds of the stocks 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 fruit trees, as when the trees are sickly from whence they are taken, the grafts often partake 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, containing to produce luxuriant fruits, 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 trees before their buds be in full leaf, which is not more than three weeks or a month before the scion is grafted; 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 scion, it will preserve 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 stocks; but, till then, the scions should remain of their full length, as they were taken from the tree, which will better preserve them from shriveling; when the scions are to be carried 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 grafts as near the time of their being inserted into the stocks as possible, as by that means they succeed with much more certainty.

Stocks Proper for Grafting upon.—The stocks 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-founded, and have a smooth bark. Where these trees are growing against walls or clipears, it will be proper to graft fix, eight, or ten branches, according to the size of the tree, by which they will be much sooner furnished with branches again, than when a few number of shoots or scions are put in; but in standard trees, four, or at most five scions will be sufficient for the purpose.

In choosing young fix 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 stocks which have been raised from cuttings or layers should constantly be preferred; but those which are suckers from the roots of other trees, should be rejected, as they are never so well rooted as the others, and constantly 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. These, besides being unseemly, take off partly from the nourishment from the other trees and plants.

And where these stocks 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 softer, and their vessels larger; so that the scions grafted in them will shoot very strongly; but they will be left disposed to produce fruit than the others; and when these acquire a good habit at first, it is difficult to reclaim them afterw'ards. The stocks most adapted to each fort will be explained under their particular genera, and in considering the nature of stocks. See Stocks.

Impl'en as proper for the Work.—These are principally a neat small hand-law, for cutting off the heads of large stocks; a good strong knife, with a thick back, to make elefts in the stocks; 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 hafs-lodgers, or woollen yarn, to tie the grafts 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 hard well-clay, in proportion to the quantity of trees intended to be grafted, should be provided, and some new well-fed horse-dung broken in among it; and if a little straw or hay be mixed amongst it, it will hold together the better. The addition of a quantity of salt will also prevent the clay from dividing in dry weather. These should be stirred 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 dried. It should be carefully kept from being exposed to frost or drying winds; and the often it is wrought over the better it will become.

Some have lately made use of another form of composition for grafting, which has been found to answer 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 flock 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 sun 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 fume condenses the mixture. It is necessary not to apply it too hot, lest the graft be injured. A person a little accustomed to this composition applies it very fail; and it is much easier for him to work with than clay, especially when the fenson proves cold.

In the pintois of grafting it is found, that in long-continued dry seasons 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 such as are taken from the lower end of the shoots, and in which the wood is plump and fresh: such as are shrivelled seldom or ever take well. When any have miffed in the spring, it has been advised to cut off, about the middle or latter end of June, some fine, healthy grafts of the sorts that are wished to graft with, and to open the bark in the same manner as for budding, covering the graft with the part 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. Forfith in a liquid state; then to warp the bafs round it, as is done for spring grafting, leaving about three eyes in the fhoot, which should be tied on with the bafs as light as possible; then covering the outside of the bafs, thus tied up, with the composition to the thickness of about one-eighth of an inch, as well as the end of the fshoot, to exclude the air and wet. In about three weeks or a month, the grafts should be looked over, to see if they have taken. When the graft begins to swell, it will throw off the composition; in which case always remember to apply more to prevent the air from penetrating the incision 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, slacken the bafs; 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 pinched off with the finger and thumb; but if they have not shot strong, 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 such circumstances the operation mostly succeeds better.

It has been remarked by Mr. Forfith, that rubbing a little of his composition into the incision will effectually prevent the canker, and in applying it round the graft, a much less quantity is sufficient than of the clay; as it need not be more than three inches round in grafting small limbs or shoots, and in proportion for those which are larger. It keeps the fecon moiil. When used in grafting, it should be of such a consistence as to work easily with the hand, or a knife, or small trowel, rather softer than grafting-clay generally is. This method, on a fair trial, will, he thinks, be found a sure, neat, and expeditious way of grafting.

In grafting, or budding, they should be performed as near to the upper side of a bud as possible, and the most proper place for inferring the feions or buds is at the joints, a little above the crofs fhoot.

And in respect to the sorts of trees that will succeed upon one another, it may be observed that all such as are of the same genus, that is, which agree in their flower and fruit, take upon each other; hence all the nut-bearing trees may be falsely grafted on each other, as well as all the plum-bearing trees, as the several sorts of plums, almond, peach, pear-tree, apricot, &c.; but as many of them are subject to admit gum from the parts wounded, as the peach and pear-tree kinds, it is found the surest method to bud or inoculate them.

All such 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 resin, which is apt to evaporate from the graft, when separated from the tree before it is joined with the flock; whereby they are often destroyed. 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 are as of a firm contexture, and are slow growers, must be grafted by approach.

It is likewise by this method that many kinds of exotic 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 stocks of the same kind which are hardy, the grafts are rendered more capable of enduring the cold, and the general effects of the atmosphere.

GRAFTING. West. See W. Grafting Toot, in Engineering, signifies a kind of spade, made very strong 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 assuming its new name in 1791. It contains 1,149 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 lake of Virginia, and E. by the district of Maine. It is divided into 50 townships, and 17 locations, and contains 23,093 inhabitants.

Grafton, a post-town in the county above-mentioned, 13 miles S.E. of Dartmouth college, and 10 S.W. of Plymouth. It was incorporated in 1778, 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 lamintes, like sheets of paper.

Grafton, the Hufanum of the Indians, a township in Worcester county, Massachusetts, containing 985 inhabitants; 40 miles S.W. of Bolton.

Grafton, Cape, a cape on the coast of New Holland, 50
GRA

GRAPE, or GRAPEVINE, a potted-plant of Ireland, in the county of Killkenny. 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 Le, in Biography, 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 requells 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 remained in MS. till the chancellor de Sillery perfurred him to publish 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 Navarre, IV. du Nom." fol. 1614, in ten books. It comprehends 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 Lewis 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 cenuse upon it from the Sarbonne, but they were unsuccessful, that body declaring that they found nothing in it deserving of censure. The real grounds of the objections to it were that the author had supported the liberties of the Gallican church; that he had censured 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 persecution 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 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. Morel.

GRAIN, GRASSUM, primarily denotes a fruit, or seed, 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.
G R A I N.

It has been advised, in order to preserve grain in a proper state after threshing it out, to have it as expeditiously as possible cleaned from the chaff, when the air is in a dry state, and put into a room, ched, 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 most contrived 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 *culling-floor* and *fan*, or flat broom, as well as the *feather*, are made use of, the broom serving to remove the chaffy parts and the more minute strawy 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 ovum 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 vermicular 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 cains 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; it is of much consequence, in these views, 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 sort 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 redefs 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 only to perceive that it must be highly prejudicial to the corn, by imparting its moisture to it, as a sort of moisture, or moulds, etc., is thereby brought on, that is attended with a mufly disgusting 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 habit of the above situations, by cautiously avoiding the too general practices of permitting the corn to remain upon the threshing-floors in the barns, particularly where they are of the earthy or slaty kinds, too long after it is threshed out, before it is cleaned from the chaff, and other useless matters; or, after it has been cleaned, by preventing its being deposited upon them, either in the loose state, or in sacks. And farther, by having great regard to the dryness of the air when the business is performed.

Influences of the latter kind much is capable of being accomplished by having proper apparatus, such as slides, fluters, 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, condivently that 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 exposing grain to the air in, as it is in, such feasons, do great mischief. But, besides air, light is essential in the preservation of grain in these circumstances, as, where it is not admitted fairly free, a kind of vegetable mucus, 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 pollexates the same property as that of other funguses, of growing where there is fearlessly 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 floors in the bottom parts of corn-chambers and granaries, for the purpose of occasionally communicating such moderate degrees of heat to the grain as would be sufficient to dry up and expel any injurious moisture that it might have attracted in damp wet feasons. On this idea it has, indeed, long ago been recommended as supported by experience by Mr. Tull, to preserve wheat, by expelling it to the action of a sun-flame degree of heat upon a hair-cloth, in a malt-klin, 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 exit. But in this method the heat should be constantly kept to moderate as not to destroy the vegetative property, or life of the grain, as, if that were the case, its putrefaction and decay would be promoted. The degrees 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 afford us much in reconciling the differences of opinion that have so long prevailed in regard to the use of air in the preservation of corn in granaries, as they sufficiently show, that when admitted in its perfectly dry and chafy 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 thrashing 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 caufing a fort of muilness.

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
GRAIN.

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 diffused. When grain is heaped together to too great a thickness at first, from the natural moisture which it contains, it is frequently apt to heat, and thereby greatly injure the sample. Frequent receiving 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 lining of all such corn-rooms should constantly be formed of such materials, as have no tendency from 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 ones, and in that way impart it to the grain that comes in contact with them. It is also equally necessary in all such cases 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 necessary 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 stands 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 anwer 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 keeping 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 modes such frequent turnings are not only extremely troublesome, but expensive, in consequence, especially in the first case, of being performed by the shovel, the plan of having sliding shutters in the middle of the different floors so contrived, as to have an inclination towards the centre of the granaries, has been had recourse 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 care, convenience, and dispatch.

This mode of preferring grain was long ago found by Monfieur du Hamel to answer perfectly well, even in cafes where it had been laid up in a moist, damp, and improper state.

There can be no doubt, however, but that grain may be preferred without having recourse to the means of ventilation, by depositing it, when in a perfectly dry state, in deep wells, 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 soft damp state, or which have been badly harvested, should not, on any account, be laid up with that which is in a dry condition and perfectly sound; as from the quantity of moisture that is contained in it, and the tendency to germination that takes place in consequence of it, a sullty bad smell is liable to be imparted 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 discredied by some in consequence of the ova or eggs of insects being liable in that way to be deposited among the grain, but it would seem more probable, when the economy of such insects is well considered, that their ova were either deposited 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 been already mentioned; yet it is most probably not only a much better, but more certain and economical method to let it remain unb reheled from the ear in the flacks in which it has been built, particularly where they rest upon fladdles 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 contain about one-half of the grain-produce after it has been threshed out and cleaned.

In cafes where the grain is ground and preferred afterwards in the flate of meal, it is the usual and, by far the best mode to pack it very closely by means of treading or ramming it into dry, close, small rooms, or large sheds, as, 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 flacks and granaries, from the convenience of it, may in some instances, be beneficial, not only to the farmer, but the public, 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 harvested or laid up, but that this loss is far greater at first, than after it has been kept some time.

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GRAIN.

In regard to the preservation of grain from the depredations of insects, and other similar animals, it may probably be the belt 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 vermiculi, 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 ova or eggs, which they do by a fort of unerring instinct, in situations where the large collections of grain are sure to furnish food for their succoress 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 belt performed by having recourse to the screen, and exposure to a free air, as has been already shown. The frequent stirring of the grain breaks the cohesion of their ova, by which the nidus of such minute vermiculi is destroyed, as on hatching they collect together, and spin or weave numerous webs of a cob-web-like suffusc for their own security and protection. And a great number of grains are attached together by them to these webs, by an infinity of small threads, both for their safety and food. Consequently, when their habitation are broken and separated by the use of the screen, they fall through its small interlaces, 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 course little injured by the operation, being only rendered more clean and free from impurities. See HARVESTING OF GRAIN, READING OF GRAIN, and STACKING OF GRAIN.

GRAIN is also applied to the fruits or seeds of divers plants, as a grain of millet, 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 that, 12 Henry VII. cap. 7. every lighting 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 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, \( 9 \); 5 scruples, a dram, \( 5 \); 8 drachms, an ounce, \( 8 \); &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 grains = 14.285714 dwt. = 14.285714 drams = 23.2457586 grammes of the new weights of France = .000142857 pounds avoirdupois.

Grain, a weight in France, = 1.2189; English troy grains = .000174415 English pounds avoirdupois = .0531217 grammes of the new weights.

Grain is also used for the figure or representation of grains on stones, flints, feathers, &c. Thus we say, morocco has a bolder and richer, that is, a larger grain, than flasgreen.

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 moss blocks of stone, by which they are divided to split most easily in some certain direction, than in any other, as wood is divided to split in the direction of its grain. Best, finest, lamella, and flratula, are other terms of almost familiar import. Experienced masons can generally discover the grain of the moss homogeneous or perfect freestone blocks, or such as will cut with equal ease in any direction, and this they often do, by observing the direction of the very 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 heat of the stone; which, it must be observed, is not always that of the beds or stratification, many rocks having flratula which crofs their beds obliquely, often at an angle, of from 30° to 45° with the bed or plane of the flratula; and such a flratula, not uncommonly, diverts the stone to split into flags or paviers or even tile-stones, or flates for houses, and into the moss thin and perfect lamina. Sometimes these oblique flratula crofs stone beds of very great thickness, and have been frequently mistaken, by inattentive observers, for the stratification itself, as Mr. Kirwan observes of the argillies or plates, p. 283 of his "Geological Essays." See Strata and Stratified.

Grain, Coalitional. See Cochnileal.

Grain, Scarlet. See Scarlet.

Grain, Oly, in Botany. See Mytragrum.

Grain, Tin. See Streaming and Tin.

Grains, in the Maleria Medica, or the seeds of vegetables, are distinguished into emulsive, which yield a considerable quantity of mucilage and oil, which may be separately extracted from them; such are almonds, and the seeds of almost all fruits; and tenaceous, which are entirely composed of a dry substance, easily reducible into a fine powder, called meal. Of this kind are the grains of all granious and leguminous 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 de-
are also peculiarly expert in their manufacture of iron and metals.

The Portuguese professed for many years an independent and uncontrouled connection with this country; but in the year 1664, 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 sprang that mixed progeny of Mulattoes, who are more numerous here than in any part of Guinea. The small remnant of trade now professed by the Portuguese is entrusted with their perfons, to whom they give the appellation of the hidalgos or gentlemen, having prettified them to their forms of Christian faith and practice, and initiated some of them into holy orders, whom they employ in propagating their notions of Christianity.

The months most favourable to trade on this coast are February, March, and April; small vessels, which are capable of falling 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 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 31 miles long, and 21° broad, separated from the coast of Kent by a narrow channel, called the "Stray," or "Yenlad." It is low, flat, and marshy, and has upon it only a number of detached hills, with some salt works. N. lat. 51° 27', E. long. 0° 42'.

GRAINED MEDALS. See Medal.

GRAINED MUSK. See Ostrich Plumage.

GRAPING, JAMES, in Geography, a physician and poet, was born at Dumf, 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 successes 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 muse, and wrote, during his leisure hours, an interesting poem "On the Culture of the Sugar Cane." He likewise composed a treatise "On the Difficulties of the West Indies," for the use of the planters.

At the conclusion of the war, he paid a visit to his native country, and at the same time published his poem, with copious notes relative to the natural history of the island. He afterward returned to St. Christopher's, and continued to practice till the beginning of the year 1767, when he was elected with a fever, which then raged in the island, and died. Dr. Grainger was benevolent in his disposition, engaging in his manners, and an able physician; he ranks also considerably above mediocrity as a poet. An "Ode to Solitude," and "A West Indian Ballad," (the latter published in Dr. Percy's collection) have been much admired. He published several medical tracts. Hutch. Biol. Med.

GRAINGER, in Geography, a county of America, in the district of Hamilton, Tennessee, formed of parts of the counties of Knox, Jefferson, and Hawkins, and bounded N. by Virginia and Kentucky. Its chief town is Rutledge. It is very mountainous, interspersed with fertile valleys. It contains 13677 inhabitants, of whom 456 are slaves.

GRAINING, in Ichthyology, the name of a fish found in the Mersey, near Warrington; it resembles the dace, but is more slender, and has a slimmer back. See Dace.

GRAINING Board is a board used by the curriers, to give the grain to their leather.

It is made with teeth, or notches, running quite across; into which the soft, moistened, suppled leather being pressed, its surface readily takes the impression; See CURVING.

GRAINVILLE, in Geography, a town of France, in the department of the Eure, and chief place of a canton, in the district of Les Andelys. The place contains 393, and the canton 10,846 inhabitants, on a territory of 185 kilometres, in 32 communes.

GRAKLE, in Ornithology. See GRACULA and PARAFA.

GRAIL, the fourth order of birds, comprising those which have the bill cylindrical, and a little obtuse; tongue entire and small; and the legs naked above the knees.

GRAILATORIÆ. See Classification.

GRAMAT, in Geography, a town of France, in the department of the Lot, and chief place of a canton, in the district of Gourdon; 22 miles N.N.E. of Cahors. N. lat. 44° 47', E. long. 1° 49'. The place contains 1843, and the canton 8888 inhabitants, on a territory of 275 kilometres, in nine communes.

GRAMAYE, JOHN BAPTIST, in Geography, a writer of history, was a native of Antwerp, and flourished in the early part of the 17th century. He studied at Louvain, and became professor of rhetoric in that university. He was afterwards historiographer to the Low Countries, and obtained some other offices of trust and honour. He travelled through the greater parts of Germany and Italy, and proceeding from the latter country to Spain, he was made captive by an Algerine corsair and carried to Africa. How he obtained his release does not appear, but his writings prove that he had been an attentive observer of that country. Upon his return to his native land, he travelled into Moravia and Silesia, and in the latter province he was, by cardinal Dietrichstein, placed at the head of a college. He died at Lubec in 1635, leaving behind him many works, which shewed that he was unquestionably a man of great learning. He wrote in prose and also in verse. Of the former are "Africa Illustrata, lib. x." 1602; "Abhanc Algeriae;" "Peregrinatio Belgica;" "Antiquitates Flandeliana;" and "Hieronimo Naunierens." The first of this series of works contains a history of Africa from the remotest periods to his own times, with geographical details, and the second is the result of local observation during his captivity. Meroni.

GRAMEN, in Botany. See Gramina.

GRAMES Murorum, Histology. See Festuca.

GRAMINA, Graffes, a most natural order of plants, the fourth of Linnæus, and the fourth order of the second class in the Genera Plantarum of Jussieu, who, chooses, to alter
after the appellation of it to Gramineae. The Latin word
gramen is supposed to be derived from gradiens, going or
proceeding along, in allusion to the great increase of many
of these plants by their creeping roots.
Jullien's second class consists of monocotyledonous plants
with a superior germen. His definition of the present order
is as follows.

Calyx, (which he terms glume,) single or many-flowered,
enclosing, in the latter instance, two or more flowers,
dipped 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 calyx by Jullien,) resem-
bling the before-mentioned calyx, mostly of two valves,
rarely of only one, or altogether wanting; the outer valve
either beardlike or awned. Stamens below the germen, of
a definite number, except in the Parieta of Aulnet, gen-
erally three, rarely two, or fix, or one; their anthers oblong,
forked at each end. German 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. Seed 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 farinaceous and much larger albumen. The lobe of the
embryo in germination is permanent and fleshy along with
the annexed albumen, attached on one side, at the bottom,
to the primary leaflet which surrounds the plumula, or bud
of the future plant.

The roots are fibrous and capillary. Stems or culms cylind-
rical, either hollow or filled with pith, jointed or sepa-
rated 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 spikèd upon a common
rachis, or panicked, concealed before they arrive at maturity
in the sheath of the upper leaf. Some species are monoicous,
by an abortion of some of the organs.

Botanists have differed much about the principles on which
the genera of Graffes should be founded. Linnaeus and Juf-
lien take into consideration the number of flowers, or rather
floret, 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 Briza, consisting
in the incorporation of the seed of the latter with the larger
value of the corolla, and its deprefed figure. It was to be
wished that the arms of graffes were permanent and constant
in the same genus, or at least species, but though constant
in some, as Arven, in others, as Agrostis and Triticum, they
are not sufficient to discriminate species.

In the sexual system Graffes chiefly belong to Triandra
Digenys. Some few have proper monocious, none dioecic-
aus, flowers, and several are polygamous, having a few male
blossoms intermixed with perfect ones furnished with both
stamens and pistils, and were therefore referred by Linnaeus
to Polygonum. But this latter circumstance is so common
and variable, and causes such unnatural separations of spe-
cies or genera, that botanists have generally agreed to pay
no regard to it in this family, but to clafs all such graffes
by their perfect flowers.

Linnaeus remarks that "Graffes 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 sustenance of animals who
feed on vegetables. They furnilh the verdure of our sun-
ners, and spread a carpet over our meadows. Their bars
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 won-
derful manner from apparent death. How秀丽ously has
the Author of Nature protected these plants, by giving
them such hard stems, while they are perfecting their seed,
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 creeping roots of graffes are formed like a tape-
worm; and are mollously fibrous, rarely tuberous or bulbous.
They confit of numerous joints and knots, each of which
has its bud, capable of producing a new stem, and the more
they are separated by the heavy trend of cattle, the more
they multiply, thus constituting the strength of the vege-
table kingdom.

"Very few graffes have any peculiar taste, most of them
having the infirpidity of pot-herbs, though some few are fra-
grant, at least when dry. None are dangerous or poisonous,
if we except the intoxicating seeds of Lomatium tenaxum.
They are the most simply confttructed of all herbs, scarcely
any of them having thorns, prickles, tendrils, flings, bracteas,
or other appendages. Their stems are with us generally
simple; in India frequently branched. Leaves always simple
and undivided, mostly quite flat, and if one side be somewhat
rounded, it is never that next the stem. The fheath of
their leaves is often crowded with a membranous stipula,
called by some tegula, which closely embraces the stem in
growing, to keep out water.

"The fructifcation of Graffes is so different from other
plants that it was judged impossible to reduce them to order.
They were first divided into Corn and Graffes, but the
former differ from the latter merely in the greater size of
their seeds, which compose the bals of our aliments, as the
finest of the graff-seeds nourish small birds. Ray first
examined this tribe scientificaly, dividing them by their
habits or likenesses, but he traced out no juit limits. Tour-
nefort, though a more eminent botanist, was not equal
to this ingenuity. Monni followed Ray, but examined the
graffes of Italy only. John Schuchart, at the perfusion
of Sherard, undertook ample and minute descriptions of
every graff he could procure, but the herbage of all is so
similar, that his descriptions, till he comes to the infir,
cence, are too little contradicted. They are, however, very
exact. Micheli first contrived a method of arrangement
founded on the spikelets being simple or compound, with
an attention also to the sexual parts; but he subjoined some
plants, termed grändinius affinis, which have really no con-
nection with them. If the sexes of graffes be attended to,
their arrangement becomes les difficult. Their infir-
cence is either spikèd or panicked."

The principal writers on Graffes, besides those above-
mentioned, are Schreber, who wrote in German, with fine
plates, coloured or uncoloured, and who is very full on their
qualities and uses; Rottböll, who described new or rare
species, with plates; Linnaeus the younger, in a thesis
describing new genera of graffes; Hort, who has published
three folio volumes, with excellent coloured plates in the
style of Jacquin, entitled Gramina Aulphiana; Leers, who
in his Flora Herbariana has delineated and engrased all the
graffes
GRA

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 Botanists, are such as have a long, narrow leaf, with no foot-fall."

- GRAMINIFOLIA, a name given by Dillenius to a genus of plants, called by Micheli and Linnaeus zanthichillia.

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 affords and teaches the principles which exclusively belong to, and which distinguish the English tongue. The French grammar professes the same end with regard to the 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 handful 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. But 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, assumes 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, because the ideas or things which they express exist with little or no variation in the nature of things. Men, as in all ages and countries, have the same organs of speech, which are similar in structure, however modified by peculiarities of conunciation. Finally, the same great law of allocation 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 uniformity truly surprising; 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 proody. Orthography teaches to form and to sound letters, to analyze or combine syllables, or to express words by their proper letters. Etymology comprehends the classification, 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 proody directs the intonation, 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 is that upon which orthography is chiefly founded. We therefore discard these divisions of grammar, and distribute and confine our observations on this subject to
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 best 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 impression, phantasy, or idea of that object is thus conveyed to his mind by the organ of sight. While this impression continues, suppose farther that the found book is distinctly uttered; he will then have an impression or idea of the found conveyed through the sense of hearing, which will be rendered more distinct, if the himself be taught to enumerate 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 so strongly connected, that the idea of the object shall suggest that of the found, 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 to closely connected by frequent use of the things signified, as not to be separated from them even in imagination, have no natural affinity with them. Any other sound than book, mean for instance, might have been associated with that object in the mind of a learner, and this last name would as naturally, by use, be applied to book, as we now apply it to the object so known in the fly. And this is the reason why the same idea is expressed by different sounds in different countries, where each found is rendered equally natural and familiar by repeated associations. Secondly, as language altogether depends on an arbitrary compact between found 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 averition, 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 flatters its meaning, and while we overlook the suggestion, we ascribe the sense to a fancied resemblance 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 suppose, 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...

cock; 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 cock cox, which exists in Greek under the form of caw, and which in Persian signifies the sound made by a strong emission of the breath. Hence the Persians express the ox kind by caw, which we have borrowed and confined to the female caw, which originally meant a lowing animal. In Chaldee, caw means a magpie, the sound of whose voice is very different from that of the cock. We cannot help remarking, that it is a limitation between found 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 Latin tongue. But we venture to affirm, that not a single instance 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 found 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 found applied successfully to other objects of the same kind; and this application leads, in a manner compels him to note those peculiar circumstances which distinguish each book, and those, on the other hand, which belong to that whole class of objects. As the found is not repeatedly associated with the former, he 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 indistinct idea of this process was probably the circumstance which led our celebrated grammarian, Mr. H. Tooke, 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 it to ignorance or inattention in to enlightened a critic, but suppose them to have proceeded chiefly from a desire which pervades his works, of rejecting the ideas of others as unjust, because they were known, and contemptuously 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 extinction or analogy have previously determined. Composition of this kind, with which a grammarian, as such, has anything to do, is as distinct from the composition of ideas, as found is from sense, or grammar is from language. Language has no power but what it has derived from operation; 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. Tooke appears not to have studied the true theory of the human...
mind; and from the want of just ideas on this subject, he
has, as we shall see in the sequel, plunged himself and his
readers in deep and manifold errors.

As general or abstract ideas, which are the chief ma-
terials of science, are formed solely by the instrumentality
of language, we may hence see the reason why the study of lan-
guage 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 best guide to the knowledge of its
powers and operations, and consequently to their proper
direction. Hence the only systems of metaphysics and logic,
worthy the attention of a philosophical enquirer, are those
which are built on the foundation of grammatical analyses.

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 mult have been, than we can
gather from any modern dialect. The primitive words of
that language are founded upon the most comprehensive abstrac-
tions; 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 clafs; and in the formation of words he is
made to descend from general to specific terms, and from spe-
cific 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 complete-
ly to annihilate the supposition, that language is solely the
fruit of human ingenuity. Moses, in his history, obliquely
tenets, 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
Adam to see 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, to cause to see, i.e. to show.
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 man in the proper use of them.

Legitimately, 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 sensible 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 division of speech in our language is into
nouns, articles, adjectives, pronouns, verbs, participles, adverbs,
propositions, 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 clas-
sification, 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 thefe. Plato,
whose notion of language as a science must have been formed
in Egypt, mentions only two, the noun and the verb; tom.
ii. 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 effence
of speech as contained in these two, because they alone
combined to make a perfect affective sentence, which none of the
rest without them are able to effect. But Aristotle, in its
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 appellative and proper. Others
increased the number, by detaching the pronoun from the
noun; the participle and adverb from the verb; and the
proposition 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

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 division 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 confluence, 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 broad division, as we shall
presently see, there is neither utility nor accuracy, and the
author was betrayed to it by a secret wish 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 proscribed in a very laboured
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 any thing, knows when he uses 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 cafe, he endeavours to console himself and his readers, under the absence of this knowledge, with the consideration that it would not be useful. We shall, however, attempt briefly to do what he thought 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 jutely, unless we know how to distinguish our thoughts; so we cannot without 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 substantives for nouns, and therefore, in their nature, names of things. 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 definitions. 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 found which is either intercalate, 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 infrequently writing on grammar, shall, in our remarks, follow the popular division.

Nouns and connectives, to use Mr. Harris's language, are significant as 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 to 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 rise and progress 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 correct, what shall we say to Mr. H. Tooke who affirms prepositions, conjunctions, and other particles, to be substitutes for those necessary words, the noun and verb. If this afflention 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 instrumentality 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 severely cenured 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 jargon, (to use his own words,) which cannot be drawn along as smoothly, and easily, and swiftly, as a carriage with wheels, but is a jargon which has nothing to connect it with the horse; nothing to direct it in the way along which it should be dragged. 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 nomos, which is from nomon, while name came probably from the Persian namm, 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 substitute or representative of all other nouns. But we shall consider this in the place usually assigned 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 plants, which the purposes of life require it necessary to specify, have appropriate names given 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 are not induced to consider 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 similitude. Thus it forms ideas of classes, or in logic called species, comprehending under them various individuals. After this the species themselves form become subjects of comparison; and excluding from each its individual qualities, the human mind forms 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 precedents 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 passively 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 affinities 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 act of separating from a thing the quality which belongs to it. Thus, the attribute to think becomes thought; and god is converted into goodness. 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 abstract, ideas are formed by the sole agency of language, and would not have existed in the flighted sense, 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 itself. Mr. Tooke rejects the principle of abstractions, and would introduce in the room of it what he calls subdivision. Thus, according to him, goodness 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 participle 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, diliigentia, to be neuter participles plural in entia, a supposition contrary to the analogy of the Latin tongue, which affords not a single instance of plural adjectives being converted into abstract nouns.

We cannot help noticing in this place an observation in the Encyclopedia Britannica, 13:4, as 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 fugitives a division of names into natural, as man, wheat, fire, &c., artificial, as boy, horses, wood, &c., and abstract, as science, motion, temperate, &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 use of its own terms. Accordingly, all artificial terms are abstract.
According to Mr. Tooke, the words in Roman letters are
plenty of northern origin, while those corresponding to
them in Latin are Latin verbs derived from them. The
reversal of this position we can prove to be true. The
Anglo-Saxon or Gothic words, which this author digni-
fiies as northern primitives grafted on the Latin, 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 labour perfectly nugatory; and nothing
more is necessary to prove it than to show that the origins
of the Latin words exist in Greek, or in one of the Ori-
ental tongues, and exist too 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 קבּ, קֹבּ, is a hand; hence קָבּ, to take in hand,
and by softening כ to an aspirate, as is often the case,
are, to hold in the hand, i.e. to have. The Greek κτρ, over-
throw, is the parent of the Latin neca, corrupted into
hacan; κι, go, go, bigan; γιος, hena, hena, to seize;
θηναι, χωρια, to roll; χωρία, ἄγω, to go, to flow;
συν, σφαν, σφαν, σφαν, chiefly lips; hence σφαν, or σφαν,
the action of the lips in throwing out of the mouth, i.e.
σφαν, σφαν, or σφαν, to soften, to melt, to feel, σφαν, σφαν,
σφαν, σφαν, σφαν, melon, to milk; κόφα, recumbence, punishment, κοφα,
κοφα, to punish; γιος, a tail, γιος, γιος, γιος, a tail
does, i.e. to prick; γιος, γιος, γιος, to fix; γιος, γιος,
delo, to wash down, to obliterate by washing, διάγιος;
μολός, moly, Goth. mánin, to mill; ζεπτίζ, Zeptós, to
plow; μολοί, to ride, tollo, tollo; ποπος, ποπος, to spin,
twist, ποπος, ποπος, ποπος, ποπος, ποπος, to make,
touch; ποπος, ποπος, ποπος, ποπος, ποπος, food, peka,
to take, ποπος, ποπος, ποπος, ποπος, ποπος, to defile, peta, to seek, in
consequence of defiling, ποπος.

Though this lift clearly shews that the Northern language
is, 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 influences of the Northern
dialect grafted on the Latin. The primitive language of
the North could have been no other than a branch of the
primaev language of men, conveyed there by the first emi-
grants, diversified and enriched by communications with the
East on the north of Afa, 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
eytymologist, through the medium of those corrupt changes,
to their primordial purity in Italy, in Greece, and in the
East, 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 subsisting 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, professing important dif-
ferences; and mischievous, because, while it pretends to trace
words

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Pinen, punere
Pyngam, punere
Tegean, figere

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words to their genuine roots, fl妹子 up all the true sources of information on the subject of language. As we have passed this cenfire on his fythe, 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 acquiesce in his positions as incontrovertibly just.

In doing this we shall adopt the words which present themselves, without much selection, referring our readers to the page where they occur in his second volume. It was impossible to err as to the derivation of right from vertum; but something ordered is not the leading idea of the term, though Mr. Tooke employs many quarte pages in explaining it on this principle. The primary sense of right is right, a relative term, denoting the means to an end. Thus, virtue is right, because it is the short or direct road to happiness. That hand is right, which does its work in the shortest way. Property is right, because it is the shortest 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 shortest way to accomplish it. "The left-hand is that which is leaved, or which we are taught to leave out of use on such occasion," p. 10. This appears to us nonsense. Left is the Greek δεξιός, and Latin levus, with l, the usual termination of northern words. Lex, Fr. loi, and our hand, is from lego, and means something read or dictated, and not something placed, p. 8. The Anglo-Saxon, legan, poner, is but a corruption of locare, to place. Julianus, indeed, means something commanded, jufnum, from jubo. But this left is the Hebrew מים, which, and the Arabic جاب, to answer or affirm. Hence, in Latin, jurare legem, to enact a law, i.e. to allow it to pass, and promise to obey it.

"To use is to do as the cook does," p. 21. Few people know how the cook does; but all know how a cook acts on fuch occasions. Kokum is an Eastern word, which, coming into Italy, gave birth to ciaua, to crow; and, changing r into the consonant I, is as often the case, to kokala, which, in Celtic, is klang and klighe, to act as a cook does with a hen. This, we presume, is the origin of cookah. Hen-picked is a figure of the fame nature, and from the same source. "Alert is all-crestia," p. 24. No, we presume it is all-crest, 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 inert, not active. A known, i.e. a man cunningly skilful, came, by the fame appropriation, from γνωρις, diligent.

"Leitza, (French laizhe) of a whip, i.e. that part of it which is let lezf, p. 32. Rather from λογος, an offer. The French laizhe, or the Italian lizza, is the Latin laxare, from λαξω, to bend. To brzz, or to burn, gave birth to brand, i.e. a mark by burning;—brandly, i.e. spirits which burn;—brown, i.e. bread burnt;—brand, brunt of the battle, i.e. the heat of the battle, or the place where the battle burns. The origin is furama, an oven. Odd is not the participle woted, i.e. something owed to make up a pair, p. 38; but the Hebrew צלח, a pair, one, fingle, singular, i.e. one that has no other to make an even number, or pair, with him. Thus we fay, an odd man, i.e. a fingle man. Leitza, p. 39, i.e. we presume, from οικος, a voice heard. The Anglo-Saxon, derived from this word, has preserved the οικος, abwanna. In Celtic it is chul, that is heard in praise of a man. The Latin has rejected the guttural altogether in lada. The Greek poets have applied the epithet αεκος to such animals as λεκ; hence lowe: spheric, or spheric, burns, share, as plough share, p. 41. come from λαξη, to clip, by prefixing s, a practice very frequent in Latin; and hence the Anglo-Saxon sferan, to clip.

One of those broad analogies by which the Latin separated from the Greek, is the conversion of a guttural into a hibial, as in μολυς, φιλος, χαρος, floruit. Thus it may be, cultus becomes, as it were, dulces, dulf, dula, i.e. a cultivated ground, and not a place filled, p. 41. "Coward is the Thracian scow, to bend; but the partake of cowar, to bend, p. 42. Bread is beared, i.e. the produce of the earth, as bears, offspring, is born, somethings born, and not from the obsolete bray, to pound, which is taken from the Latin frico or jfrone; both of which originated in the Arabic بفر, phara. Fried, for is the participial termination of διης, or διες, violence, in which, as Socrates says, there is entity; while friend is the same form of gwra, a woman, (from οφις, i.e. the bearing animal,) and feems at first to mean a female loved. The letter l, being of the same organs with r, is often changed for it in all languages, as ροθομ, λυμπα; πραμος, palmo. On the fame principle, the Hebrew נג, naaph, to marry, became laph, or love. The Hebrew אב, is, and the Persian bbad, self, paffing to the North, gave birth to the pronoun ḥis, or, as it is farther corrupted, it, which, like ḥd in Latin, directs the attention to something going before, and is a substitute for it. Gothic haitan, Anglo-Saxon haten, or getan, to speak or command, is, perhaps, the Greek ἀνάω, which, in Celtic, is gawd, in English quah, and in Latin in the compound form of inquit, p. 53.

Right, i.e. tied, and the Gothic hin, is from πυκτες, to fold up, 67. Test is tortus or tofrus, and not that which is toned. Quilt is eulded, (ευδει) twilled. Draught, drag, is τραγος, a beast. Tilt is tilted, lifted, from νιλος, toldo. "Bare, i.e. barred, closed, shut," p. 72. The verbs ζημιζε, ζημιζε, parea, pora, poro, with the participles of words derived from these in all languages, owe their existence to the Arabic barron, the earth, or that which produces all things: and barren, we presume, meant primarily an animal having produced; and hence it denoted insensitivity, consequent on production, or, more generally, incapacity to produce. The Hebrew לדר, sler, denotes any thing close, sharp, or hard. Hence the Greek ρικος, form, rigid; and our fler, p. 73. The same word in Arabic means a barth or acute found, and hence seemingly the English flir. The Arabic יד, slir, which we should pronounce sler, denotes to flow, or to move as water does. Hence the Anglo-Saxon sleren, which means to cause a ship to move, which is the meaning of the hence-derived slir. Stern is that part of a ship which is thus moved. The Hebrew לזר, girs, to turn, has given birth to curr, turning or slirring cream being the means of obtaining butter, which in Anglo-Saxon is gurman, 76; to year, which is a revolution of time; toyea, which means therefore something turned or twirled, and not prepared. Port, plus, means hair on the head; hence it signified to form hair, or to grow into a head. And this is the origin of our word pile, build. Bold or bold originated in word, bodily strength naturally inspiring mental energy, 79; but bolt, p. 128, is בול or בול, the thing call, 129. Bear is the Hebrew בּאר, bamer, a sturdy stupid animal; but brown we think is not baren, but porc, porken, proken, brownen, from porcos, and therefore it means the flesh of a pig, 87.

Clip, chip, is something cut with, from κοτος. The Anglo-Saxon plkoma, to pledge, is from κοτος, κοτός, to strive, plight being a baraigne strick. Slut is the fame in fenne and fownd with the Arabic יולס, flot. The Anglo-Saxon fitan is nothing but the Hebrew יולס, flot, nates; and hence it came to signify the action of the nates in throwing away the excrements. We shall merely add the following lift, and all the words
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 shew 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 dif-
cernible, or not necessary to be distinguished. But unfortu-
ately the termination of nouns became a mark of gender
independent of their signification; and thus nouns were con-
sidered as masculine, feminine, or neuter, as they happened to
have the endings which custom usually assigned to either of
these three classes. The Hebrew tongue, in its primitive pu-
ritv, appears to have been exempt from this unhappy embar-
rassment, 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 Bengalee. In
Greek and Latin the dictates of reason have so far prevailed
as to cause all these nouns, whatever be their terminations,
which mean males and females, to be deemed masculine and
feminine; while the names of inanimate objects only are de-
termined by the termination. In other languages, such as
the Arabic, French, and Italian, this absurdity has been car-
ried much farther, the names of inanimate objects being
founded on reason; 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 facricle of common sense.
The English language, as conforming to nature in re-
gard 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 perfonification. This figure is
essential to poetry. In order to interest the imagination, the
subject of discourse, when inanimate, must be invested with
the forms and attributes of living beings. Now, when things
are thus personified 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 differs even in things without
sex of different analogy to that great natural distinction which,
according to Milton, animates the world. In this view we
may conceive these substantives to have been considered as
masculine, which were conspicuous for the attributes of im-
partiality, 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 husband
or otherwise. The feminine, on the contrary, were such as
were conspicuous for the attributes 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 excelses as were rather feminine than mas-
culine." On this principle the for, as imparting light, is mas-
culine; the moon, as receiving it, feminine. The.fy, or other,
time, death, the ocean, the Supreme Being are all masculine;
while the earth, hop, city, virtue, religion, are feminine. And
yet Mr. Tooke roundly pronounces this reasoning fallacious.
"As for Mr. Harris's poetical authorities, the Muses are
bitter bad judges in matters of philosophy. Besides, that
Reason is an arrogant deport, who, in his own dominions, admits
of no authority but his own. And he is particularly un-
fortunate in the very outset: for his very first instances,
the fun and the moon, destroy the whole sublimity 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, fun is feminine, and
moon is masculine," vol. i. p. 54. The author of the
learned treatise on grammar in the Encyclop. Britannica, 17,
refuting no doubt on the authority of Mr. Tooke, thus
pronounces on the reasoning of Mr. Harris: "Such specula-
tions are wholly fanciful; and the principle on which they
proceed are overturned by an appeal to facts. Many of the
substantives that 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 distinc-
tion 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 na-
ture. Mr. Harris deduced his theory from the English,
though he has applied it with perhaps more fancy than truth
to some inferences in the classical languages. Our own tongue,
as making all things neuter which have no life, admits the
operation of fancy in perfonifying inanimate objects; and
where perfonification is admitted, the analogy to the natural
distinction of the sexes must necessarily be admitted also.
But, Mr. Tooke and his abettor, it is fanciful because
it does not obtain in other tongues. Their argument is brieferly this:—The fun, by perfonification, is not made
masculine in English, where the consideration of gender is
founded on reason, because it is made feminine in some lan-
guages where the termination, and not reason, determines the
gender. Reasoning of this kind is not only inconclusive,
but frivolous; and the analogy flayed by Mr. Harris invari-
ably 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 agonise against the dictates of reason
and analogy, than we ought to deny a regard to the dif-
tinction of sex in the nouns of one language, because the
gender of the same nouns in others is regulated by con-
derations 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. Hal-
hed, 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 Persian and in the Greek. That the idea of multi-
tude 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: new
love to study, and man loves to study, are phrases perfectly
equivalent. So also we join to a noun in the singular num-
er an epithet of indefinite plurality to convey a plural
meaning: many a man is written by the Bengalees beklob man-
baqoof. 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, whose high antiquity unfolds to the philosophical enquirer the several steps which mankind took in the formation of speech: 

מִיָּלְאָן, ָּּאָלְּבָּה, man, multitude, became, for the sake of brevity, into מִיָּלְאָן, ano-th, men. In the Chaldean and Syracia the final n was changed into n. Hence the Hebrew em in Chaldean became em, in Arabic en, in Persian an, to denote the names of animals, and its inanimate things. And from this source are derived the plural terminations in an or a in the Anglo-Saxon and German tongues. The letters n and s being of the same organ, the Chaldean em became s in the formation of the Greek, or s 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 it. Thus the plural termination in all languages, ancient and modern, appears to have been derived from one source: and that confided of the annexation of a noun of multitude to the singular form of a preceding noun. And it is remarkable that in the Bengalee, which is but a branch of the Slavonic, this mode of expressing plural nouns is preferred to this day; as, пряса, a peafant, прясъл, пеаftant-people, прясъл, пеаftants: лоб, signifying people annexed to the singular noun whatever it might be. We shall only observe, that the names of classes only admit the plural form; while proper names in all languages are, by their signification, 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 signification, are necessarily plural.

We come next to the consideration of cases, 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 furest way to ascertain the nature and origin of cases, 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 case, and likened the noun in this, its primary and original form, to a perpendicular line, such for example as the line

\[ A \rightarrow B, \quad C \rightarrow D \]

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, then, they only called these variations παράλληλα, сαφοῦς, καταλόγον, ορισμόν. The Stoics, on the contrary, and the grammarians with them, made the nominative a case also. Words they considered (as it were) to fall from the mind, or diffusive faculty. Now, when a noun fell thence in its primary form, they then called it παράλληλα, καταλογοῦς, as erect or upright case or falling, such as A, B, and by this name they distinguished the nominative. When it fell from the mind under any of its variations, as for example in the form of a genitive, a dative, or the like, such variations they called παράλληλα, καταλογοῦς, καταλογοῦς, oblique cases or fide-long falling, (such as A C or A D), in opposition to the other that is, A B, which was erect and perpendicular.

Hence, too, grammarians called the method of enumerating the various cases of a noun ὁμοφωνία, declination, a declension.

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We copy this account because it is very plausible, though we regard it as erroneous; the learned author and Analysts (De Interpret, p. 35), 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 case, 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 accusative is the effect, in which the action straightforwardly 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 accusative as well as the nominative are right cases, or direct parts of a proposition; whereas the genitive, dative, ablative, and vocative are oblique cases, or indirect parts of a proposition.

From this simple statement, which we recommend to our readers as important, we infer, that a case did not at first mean a change in the termination of a noun, but the position or the case, or form, a noun 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 noun or other word may mean more specifically, 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 corresponding to the effect, is the accusative. But in the sentence God is good, we cannot say God is the agent, because the verb is not to express an action, but serves only to connect the epithet good with God. The nominative, therefore, here expresses not the agent, but the subject of the attribute connected to it. The nominative case, then, is that leading finite or position which expresses the subject of a connecting verb, and the agent of an active verb. And the accusative is that position which expresses the effect of an active verb, and thus a simple position will carry us: and the nominative and accusative have evidently to each other the relation which a cause 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 cause or agent, but the origin of that cause, or the influence by which it acts, or the end for which it acts. In such cases simple position will be of no avail. I must have recourse to some other expedient, and no expedient so well can serve as suitable words to express origin, instrumentality, 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 succeeding it, as being the origin of the title, is said to be in the genitive case. In the second, by denotes instrumentality or mediun; and as death is the instrument or medium by which Christ redeemed man, it is said to be in the ablative case, and might more properly be said to be in the instrumental or mediun case. In the third sentence for expresses the end for which Christ redeemed man: the noun happiness succeeding it, is therefore in the final case, or as it is commonly, though unmeaningly, called the dative case.

The cases, then, or those leading positions of a noun that answer the purposes of speech, are the nominative, accusative, 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 person, and thus to fix his attention. In this sentence the noun is said to be in the vocative case, and the object.
sometimes preceded by the 'interjection O! 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, then, contemplate the connection 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, propositions, denoting these 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—happiness—far. And it is remarkable, that in the Tindalean pronunciation 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 god's, god's, god's: and the variety of terminations given by this means to the noun is the origin of cases. Modern tongues, in rejecting this variety, and substituting prepositions, have only resorted to the original purity of language.

Grammarians have generally concurred in defining cases to be changes of termination. In this, as in the above account be just, they are mistaken, not only because position is the primary and essential idea of a case; but because while they reject prepositions as marks of cases, they consider cases defined by them as only other than the prepositions which they reject. Conformable to this notion, they maintain that the English noun has no other than the possessive case: and Dr. Lowth and Mr. Lindley Murray, pursing 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 case, 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 ideas of the most acute and learned grammarians have hitherto been confused and contradictory on the subject of cases, especially the oblique cases. And 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 cases, and gives notice that some connection indeed subsists between two objects, but does not point out the particular kind of connection. That we may 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 adding innumerable examples, in which the relations expressed by this case are different.* These observations clearly show that this writer did not himself understand the meaning of the genitive case, 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, source, and 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: of, ab, a-r, de, ab, percut, ftent, 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 injuria regia the writer says, no man can know whether the injury mentioned be an injury inflicted, 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 expresses beginning came to signify the owner or possessor. And thus the genitive in Greek and Latin expresses the relation of possession, and answers to what is called in English the possessive case. 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 case, in our tongue, is an acquire abbreviation of the genitive termination of the third declension in Latin, father's house, father's house, the apotrope 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 all, containing himself with saying, that it has nearly the same sense with the accusative, 19. 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, compare Virgili commoros. The imitative object of comparison is Vergil, and Horat 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 inferences, the mind brings under one view the person compared and the person to whom the comparison is made; and this proximity or juxtaposition constitutes the affinity which the writer erroneously supposes to be between the two cases. Antonius loit Cicerone, and Antonius vocat Ciceroni, he further supposes to be expressions of the same import; but in this he has been misled by the genius of our tongue, which would express each phrase by Antonius dicit Ciceronem. But this is the exact meaning of the first clause only. In the second claus vocat expresses not an action, but affirms a quality. Antony was hurtful to Cicero. Antony was hurtful. Cicero was a person to whom his hurtful behaviour was directed.

The dative case 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 inferences 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 these 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 cases are often used one for the other, which is certainly a great impropriety in that language, and which occasions 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 concomitance; but this is not the primary sense of the ablative, as the author of the above treatise erroneously supposes.
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 name quality existed in the same or in a different degree, in different things, men, however rude or uninformed, learned to form ideas of qualities independent of the substances to which they belonged. Hence they acquired that class 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 adjectives or added to nouns, and for this reason they have also the name of adjectives. 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 qualities, and then generalizing it so as to make it an epithet expressive of a similar quality in different things. Thus in ἅλκη, a deep rock; the quality deep, 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 ἅλκης, proous, prone. 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 so arranged them a particular termination. 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 ἐπίθετος, food, relish, was changed into πρόσθες, signifying agreeable food or wholesome relish. Thus also wood, wind, became woodo, wind, 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 abstractive 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 discovering to another of something unknown, naturally says, that it is like to some other that is known. Thus in Greek ἑιδος, image; ἑιδος, form; ἑιδος, like, are combined with nouns in order to express likeness; ἑιδος, man-like, ἑιδος, having the form of Heracles, Heracles-like, i.e. the son of Heracles; ἑιδος, man-like. This last termination, by inferring ἑιδος, gave birth to the Latin adjectives in -ides, and to our adjectives in -ous, -ous, -ous; glorious. The numerous adjectives and adverbs in English are formed on the same principle. Evidently, i.e. earth-like, which is the Greek ἱδος, Gladstone is gladstone, the same with glad; same, or same being, we conceive, corruption of saints. The termination -ides is originally the Persian -ides, added to a noun to express likeness; as γλαύς, the more; γλαυσ-ides, moon-ide, like the moon; woman-ide, like a woman. The termination -ides, derived, it is allowed, from the northern language, is borrowed by that language from the Greek participles in -des. In the same manner we form some adjectives after the analogy of the past participles in -des, as θεμελ-ides, written; while that of y is the Anglo-Saxon iy; but this is only the Latin termination -ius, as unus, Anglo-Saxon ain, any.

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 whose qualities presuppose motion or action; and they imply greater power of abstraction than those derived from nouns. Mr. Tooke, indeed, denies this power as a principle in language; and by this rejection is led to deny the existence of adjectives as a class distinct from nouns. His definition is the following. "An adjective is the name of a thing, which is directed to be joined to some other name of a thing." (Vol. ii. p. 241.)

As his authority on the subject of language is so high in the estimation of many, we shall briefly examine and refute the above definition. His arguments are these: "I think you will not deny that gold and brass and silk is each of them the name of a thing, and denotes a substance. If then I say a gold ring, a brassen tube, a fillet string, here are the substantives used adjectively, yet names of things, and denoting substances. If again I say a golden ring, a brassen tube, a fillet string, do gold and brass and silk cease to be the names of things, and cease to denote substances, because, instead of coupling them with a 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, brassen, fillet, convey to the hearer's mind, and denote the same things as gold, brass, and silk? Surely the termination en takes nothing away from the substantives gold, brass, and silk, 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 silk are designated by this termination en to be joined to some other substantives;" p. 439. Again he says, p. 444, "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 comprehensive 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 Mohicanew 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 unrolling that simplicity and precision which mark the progress of the human mind in the formation of language, tends to crape the very elements of knowledge, and to confound ideas the most palpable and distinct. Our ideas of qualities and ideas of things. The distinction between these classes is universal; it is common to the philosopher and the bulk of mankind; and is most readily comprehended even by children. As we have our ideas of qualities, language must have means to express those qualities, i.e. it must have adjectives; and as our ideas of qualities are in their nature distinct from, though concomitant 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 things 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 substances which prefix 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 association. This principle is so powerful and infallacious, that it changes the nature of a word, in consequence of its connection with other words, and of our previous experience. Thus, the ladies *fem* themselves — "The plump people *eye* the falling verdure." Because we have experienced the medium 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 the circumstantial 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 on signifying to be added is a conceit of this grammarian, and has no foundation in truth; for it is the Greek participial termination in *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 association 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 noun 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 inerring 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 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 Mohigans. If there existed a language which had no verbs, but nouns converted (as in the above influence 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 clarify words only by their endings, might say of that language, that it had no verbs.

The foundation of Mr. Toole'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 constitution of language, he inferred with confidence, that they were nouns *still*, thus confounding in one profusionous 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 contrivance of language, one of the foundations of those heaps of false philosophy and obscuré (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 they 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 deriv'd by certain syllables added to the positive: the adjective itself, by being thus lengthened, is made to correspond with the augmentation in force, which the quality acquires by comparison. The mode of expressing the degrees of qualities being only new, and therefore very general and imperfect, while the qualities themselves vary in endless gradations, a more adequate method is aff'd, 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 allusion of a preposition, be made to express the comparative or superlative degree, as *Blissed among women, i.e. the most bliss'd of women.* And this relative or comparative idea, implied in the positive, is the reason why the positive has sometimes after it the case 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: "Trifior et lucernis cuculus fufida intentans,"—*Trifior, more fad then usual, i.e. very sad.* This is more usual in the superlative degree, *vir defignatus, a very learned man.* The comparative is used with propriety only when two things are compared; the
The superlative when a thing is compared with many. The elder of the two—the elder of all. Nevertheless it is to be observed, that multitude may be the object of the comparative, if preceded by all or whole, to give it a collective idea; as, "he is wiser than all his teachers, i.e., he is wiser than the whole body of his teachers,—he is wiser than them all put together;—or, compared with his teachers one after another, he is wiser than them all." 

The Origin and Properties of Pronouns and Definiteness.

Pronouns have been defined substituents for nouns, to prevent their too frequent recurrence. Mr. Harris accounts for pronouns, or, as he calls them, curious of the second order, in a different way; and, as his explanation is curious, we shall here place it before our readers. "All conversation 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 substantives 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; I write, 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 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."

This account, which the author, as he says, received from Apollonius, is arbitrary and erroneous. The use of the pronouns is not to supply the names of persons unknown to each other; nor can they be said to have been invented for though they answer the most useful purposes, they originated in circumstances in which design had no concern. The origin of the two first pronouns we conceive to be this. They are the adjectives one, two, losing their numeral signification, and coming to mean the speaker and the person addressed, by the mere force of affection with the verb. Let us suppose a person wished, in the infancy of languages, to express the proposition I love thee. If English were his words, he would have said, one love two. This form being repeatedly used, and the person using it accomplishing the leading term one with a consciousness of himself, that term would gradually drop its character of one in opposition to two, and derive a new character by affection from the verb, namely, one that was speaking in opposition to the other spoken to. Thus the same process which converted one in general into one speaking, converted two into the person addressed.

That the pronouns I, thou, were originally one, two, will appear probable from hence. In Hebrew, the most ancient language, the pronoun answering to I is evidently the present of the verbal numeral one; and two has a close resemblance to thou. Thus, I is 1, and ego, is 3, in Greek, and unus in Latin, and the other forms unus, euo, are also. Moreover, unius, aoi, by dropping οι seems to have produced τοι, του, thy; and his, duo, two. And in other tongues the pronouns thou and the numeral two have such resemblance as to bespeak one common origin in Hebrew. Besides, the pronouns I and thou still retain their origin in their names; I being the first person, thou the second; not because the former is the first and the latter the second in dignity, but because these were their original meaning. Moreover, the numerals one, two, must have been among the first adjectives formed by abstraction from such things as nature produced in pairs, or those which alternately succeeded each other, such as day and night. And as discourse is but an alternation or interchange of sentiments between two persons, the numeral adjectives in question were the most likely to be used on such occasions. Remains of this usage may be still traced in some languages, as we say, One thinks so, or in French, En dit; one being not as Condillac (see his Works, tom. v. p. 184.) affords, a corruption from homm, but of the Latin unus, and is not a substantive, but a substitutive for a substantive, i.e., a pronoun. Finally, we observe that no words but numerals were capable of being formed by affection into pronouns. The speaker, indeed, might use his own name, and which, when repeatedly used, the verb would convert into the first person. But on the same principle another would employ his own name, and thus the associations of one man would counteract the associations of another; and neither name would be received as the representative of the speaker.

From this statement of the origin of the pronoun, some particulars respecting its nature and use may be deduced with precision. First, the adjective, in being changed into a pronoun, loses the generality of a numeral, and assumes an individual character; that is, the character assigned to it by the verb. But as any other person may use that term in similar circumstances, the pronoun I, which was changed into the index of an individual by affection, becomes again general by succession; each speaker having a right in his turn to use it: and thus the pronouns I and thou became substitutives for the names of all persons in a change of situation. Secondly, I and thou are not, as has been hitherto supposed, substitutives for the names of the speaker and the person addressed, to avoid their too frequent repetition, nor yet substitutives for those names while yet unknown, but representatives of those persons in that limited or restricted character which they derive from the affixed verb. Now as speakers there is no difference between a man and a woman. A man that speaks and the woman that speaks, in that particular function, is the same; and the same thing holds in regard to the person addressed. The first and second persons, therefore, have not, in any language, the distinction of gender merely; because they represent human beings in that particular character which excludes the idea of sex. Thirdly, there is, properly speaking, no such thing as a third person; this being a definite, marking the subject of discourse, and said to be the third person in reference
ence to the first and second, and thus represented as something distinct from them, and not included under them. Thus ἄνθρωπος, in Hebrew, and be in English, were, as we shall presently see, but the article; and for ἄνθρωπος, we, us, them, in Greek, and bis, ils, ii, in Latin, are all species of restrictive or definitive adjectives, agreeing with the defined noun expressed or implied. As the first and second persons represent two individuals in particular circumstances, they comprehend no other noun under them; whereas the third person is only, in general a subject of discourse, and therefore it comprehends any noun in the language, excepting the first and second: accordingly every subject or agent in every language is the third person singular and plural, except four, I, thou, we, and ye, or their equivalents. The first and second person, we have seen, exclude the idea of sex, whereas it is a character often necessary to be marked in the subject or agent; for this reason pronouns of the third person have the triple distinction of masculine, feminine, and neuter.

All the three persons admit the plural number, as each is capable of representing numbers. In our own tongue I, we, thou, you or ye; he, she, it, they. Here it may be observed that ye is a corruption of you or you abbreviated; and as this abbreviation naturally takes place in the nominative or vocative, when the persons addressed are called; and as it is necessary to be distinct when expressing the addressed persons as affected by a verb, ye is used with propriety only in the nominative or vocative, and you in the accumulative. Men being usually surrounded with attendants, it became a compliment to address a person as such; in the same manner as in Greek, ἡ ὑπάρχον, those around Priam, was a respectful way of designating Priam. Hence in common discourse we use you for them; and on such occasions the verb also should be in the plural, as you were and not you went. But this complimentary style is not applied to the Supreme Being, who is always addresed by thee, from a regard, probably, to his unity, numbers being not able to add to his dignity or greatness. The royal style we has respect to the king's counsellors, who are supposed to advise the subject of discourse, and who are responsible for it. With regard to the third person, though it be convenient to mark the gender, it is not essential: for the plural they is made to represent men, women, and things, without any inconvenience or ambiguity.

The personal pronouns, contrary to the analogy of nouns, have each three terminations, or three variations, to denote cases. This is owing to their being derived from the Greek and Latin, with their respective inflexions. Their genitive, dropping the primary sense of beginning, has uniformly the secondary sense of possession. Hence it is called, in our tongue, not improperly, the possessive case.

In Hebrew, Arabic, and Persian, the personal pronouns are converted into adjectives, by being annexed to nouns, which, from their position, are called suffixes. In this state they are somewhat abbreviated and changed: but however changed when connected with nouns, they are always adjectives, but retain their personality when affixed to verbs. In our own tongue the personal pronouns are changed into adjectives from the genitive or possessive case: as mine, my; thine, thy; his, his; ours, ours; yours, yours; theirs, their; or, our; your, your; their. Thus formed, they are properly called pronounal adjectives—adjectives, as qualifying nouns, and pronounal, as derived from the personal pronouns. His must be considered, by coals, as properly an adjective of this kind, through the genitive he's. These pronounal adjectives, as derived from the genitive, may be resolved into the signification of that case: as my of me; thy of thee; his of him; though seldom in English used in their personal form. The reason is, that our tongue has a strong propensity to convert nouns into adjectives by juxtaposition, and thus to use them for the sake of brevity, instead of the genitive: as when we say felt-flying for flying of felt, and gold-ring for ring of gold.

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 personal adjectives.

The reciprocal or reflex pronoun self is added to these personal adjectives: as myself, thyself, &c. The third person singular and plural by analogy should be his, herself, and therefore: but in order to honour the ear or the organs of speech, there are changed into himself and themselves. Self means an individual in opposition to another, and is derived from the Latin solus, alone, through the medium of the Anglo-Saxon sol, sol, Anglo-Saxon self, self: hence also soul, which means that part of man in which consists the vital principle is opposition to the body: e.g., often used to precede self, is a corruption of the Anglo-Saxon egen, which by the iteration of the letter g, after the analogy of that language, is borrowed from the Latin unus. Oneself, therefore, is oneself.

Mr. Harris gives the following account of that species of adjectives called definitions or articles: 'The visible and individual substances 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 proper name, or whose proper name is not known, we ascertain it as well as we can, by referring 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.'

"But this 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 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 puts 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 intimates 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 desinfects, as they circumscribe the latitude of genera and species, by reducing them for the most part to denizens. The difference between them, however, is this: the article a leaves the individual itself unascertained, whereas the article the ascertains the individual also, and is for that reason the more accurate definitive of the two.'

We give this statement as that of an eminent grammarian, without subscribing to it as just in all respects. It is not, we consider, true, to say that the individual defined by a is always unascertained, and the same not 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 these words to their sources, and thus ascertained their primary meaning, their readers would have been more inform-
ed in one paragraph, than they otherwise could by the most elaborate treatise.

The article a is in truth the numeral adjective in Greek, used in Latin, enim, &c., &c., in Anglo-Saxon: and the import of it professedly accords with its original signification of one of book is one book; a man is one man. Hence it 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 definite article. That as it means one it cannot be prefixed to plural nouns, unless those nouns be taken in a collective sense. That the usual rule, a becomes an before a vowel, should be just reversed in order to be true. "An 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 language is so far from being necessary, that it is an incumbrance and inelegance. 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, videt hominem, legunt libros, where nouns would be both mass-efficacy and inelegant. The English I see man, and the Latin videt homo, 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 Encyclopædia 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 inflections, we mistake the word 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 be 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 shows that even a wife 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 seldom be at a loss for some plausible reasons to justify it. In truth, the inflections 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 show that they qualify that term, and depend upon it. The very example adduced by this writer shews the fallacy of his reasoning: Exspectavit a patre annos multos. Here annos as clearly denotes not the whole species, but an individual, as if it was written a diem. This and that not because of the singular correspondence of annos, nor from the termination of multos. Of this there is an evident proof; for annos and multos would be still the same, though multos 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, whose name was 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 any ambiguity; and the expression seems uncouth 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 than or thereon, to take. But these definitives exist in that language, and why should we 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 same verb thane, which may supply the place of the correspondent Anglo-Saxon article fe, which is the imperative of feon, edere. For it answers the same purpose in discourse to say—feo man, or take man." The English take, and the Anglo-Saxon stigen, which this writer would lead us to regard as a primitive northern word, is only the Greek toke, to accept. Take this, therefore, means, receive this.

Light is the medium of sight, and hence, in the most ancient languages, the word signifying light gave birth to verbs signifying to see. Thus the Hebrew סָנָה, סָנָה, pronounced in Arabic tha, but in Persian fea, feea, is the parent of the Anglo-Saxon seon and our see, which coincides with the Persian pronunciation, and also of the Anglo-Saxon fea or fe, 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 very different word. For its original appears to have been the Hebrew article נ, which probably was founded on or is short, and which is but an abbreviation of עָבָד. Now the use of this last confines in directing the attention to an object, and answers to en or esse in Latin, and behold in our own tongue. And as the necessary consequence of looking upon a thing is to see it, as distinguished from other things, hence נ in Hebrew, in Greek, is the in, from signifying to perceive, through the medium of light, came to signify an effect of perception, consequently, the distinction or opposition which the thing to be seen has to other things which may be regarded in it.

From this account we may gather the following particulars respecting the nature and use of the definitive article. Its primary force consists merely in directing the eye or the attention to an object; and the definitive power alligned to it is rather an effect of the sight 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 the is the name in origin, and often in use the name 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 definitive is in our tongue variously applied; and the objects of its application are so distinct and different, that it has been thought to change its nature, and to belong to different parts of speech. And Mr. Tuke 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 denote individual objects; as that book. In this sense it is opposed to this, answering to ill as opposed to hic in Latin. Ill, that, denotes the remotest of two objects; hic, this, the nearer. "Alexander and Julius Caesar were great commanders, that (ille) conquered Africa; this (hic) subdued the Gauls—they, meaning Alexander as the farther off; this, Julius Caesar, as the nearest." In such a sentence it would be more usual to say the former and the latter. Secondly, that is frequently used to characterize a whole 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 wish you to believe that (that thing which I am going to say, namely,) I will not hurt a fly, by which Mr. Tuke thus resolves, I would not willingly hurt a fly; I wish you to believe that affirmation." In this application it answers to quod in Latin. Thirdly, that is also used to point out the end or purpose, which a person has in view, and as such it precedes a verb in the subjunctive mood, expressing that end thus: 'Thieves rise in the night that they may steal.'—"Thieves rise in the night, that being their purpose, namely, they might steal." In such a sentence 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. Fourthly, it 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 some, 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 fort 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 fort 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 those there is another pronoun (in Greek ἥν, in Latin qui, in English who, whom, that,) a pronoun having a character peculiar to itself, the nature of which may be explained as follows. Suppose I was to say light is a body,—light moves with great celerity. These 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 an and) saying light is a body, and it moves with great celerity; then by conection 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 it we substitute that or which, saying light is a body, which moves with great celerity; the sentence 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 specious, we nevertheless deem erroneous; because the relative pronouns in all languages are the same in their origin and use with the articles or definitive pronouns. In Greek ἗ν is only the article ἵν with annexed after the analogy of that termination in Greek nouns. Hence the reason why and is, are, by the more ancient writers, such as Homer and Herodotus, used for one another, either as demonstrative or relative pronouns. The Latin hic is also the article istic with a guttural annexed—hoc; while qui, which Sculiger, and after him Mr. Troke, derive from sei, is no other than the Persian kii or kii, which, scul. Moreover, qui is the Oriental kii, who or what, and it is remarkable that in Hindoo kii is redoubled kii kii, and this has been imported into Latin qui qui. Finally, our who is the Greek ἤν, having the labial as substitutes 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 istic formed on the same principle as hoc in Latin, that is, a guttural is annexed to wake, who, which is made to stand for inanimate things.

As the relative and definitive 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, therefore, who never condescends with the antecedent noun, and is therefore a substitute for it, and this peculiarity in our own tongue has caused who, with other such words as whom, 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 he, which was the Hebrew and Greek article, ἅν, or ἵ. And this is the reason why the article in Homer may be often rendered by he 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 be always resolved into a pronoun. The foundation being thus fallacious, the whole super-structure, however learned and elaborate, is frivolous and useless.

We observe farther that his, istic, and in, which are really, definitive, 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 habeat scutum: namque istic mihi miem Corde: illius aram fcerpe tener niloris ab ocellibus imbuat agnus." Here the istic is ille homine, 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 ilius dei, of that god. "Tres litora victis proficisci errantium, hos tota armenta sequuntur, i.e. hos cervos." "Cognoscamus Deus ex operibus ejus," we know God from the works of the same—ex dei.

Because the relative qui is thus a definitive, the defined noun, when not antecedent, is made to succeed it in Latin...
and in Greek, as “Maxima laboribus confequantur can, quam ex discedo capiunt, vulgetatem,—literally,] with
the greatest toil they purvey that, which pleasure, (for that
pleasure, which) they derive from flandy. “Qua considunt
ares, 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, and even inad-
lignible, because here the relative is really a sublitate for
the noun preceding it, and refuses to coalesce 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 de-
finitives are not pronouns, but adjectives, numeral or reflrefive,
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 it is
eroneously supposed to want. Thus, hic homo, this man,
ille homo, that man, is homo, the same man, ipse homo, that
very man, are phrases, either of which is equally definite and
emphatic with our the man, and on many occasions pre-
cifically the same with it.

Before we close 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 an article; and however,
and whenever, used in English, means the same thing as it,
or that, or such. 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 under-
stood the nature of the article, he would not have made this
affirmation. 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 es, an
adverb of similitude in Greek, which is being inverted (as is
often the case with monosyllabic words), has become fo.
On the other hand, the consequence of the indication con-
veyed by the article is not to the observance of some like-
ness between the objects specified, but the limitation of the
general term to the individual object, circumscribed by the
eye or the mind by being so indicated.

In a note this writer adds: “Dr. Lowth, amongst some
false English which he has recommended, and much good
English which he has reproved, says, fo-as, was used by
the writers of the half century to express a consequence in-
stead 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 tense we have
affixed it in the preceding page, and if es, on the other hand,
signify similitude between two objects, fo as is, as Dr. Lowth
states, very improper; while fo 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 false, and reproving much good English. We can-
not help observing that the object of comparison marked by
as is often implied, and is to be gathered from the context;
as in the following stanza:

Save that from yonder ivy-mantled tower,
The mourning owl does to the moon complain
Of such as, wandering near her secretower,
Moleit her ancient solitary reign.

i.e. complain of such prorsus, as those who wandering, &c.
The Origin and Properties of Verbs.

We shall begin this part of our subject also with an ex-
tract from Mr. Harris, because his opinion, though plaus-
ible, is erroneous, and has been the cause of leading other
grammarians, who followed his authority, into error. “We
are now,” says he, “to defend to the common herd of
attributives, such as black and white, to write, to speak, to walk, &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 affective sentence; while the
rest, though otherwise perfect, are in this respect defective.
To explain by an example, when we say Cicero or
Cicero: wife, these are imperfect sentences, though they de-
note a sublitate and an attribute. The reason is, that they
want an affectio to show such an attributive appertaining
to such substance. We must therefore call in the help of
an affectio elsewhere, an is or to, to complete the sentence.
Cicero is wife, Cicero was eloquent. On the contrary,
when we say Cicero wriileth, Cicero walketh, in instances like
these there is no such occasion, because the words in

difl'rect imply, in their own form, not an attributive only,
but afilerion likewise. Hence it is they may be resolved
the one into is and writing, the other is and walking.

Now all these attributives, which have this complex
power of denoting both an attribute and an affectio, make
that species of words which grammarians call verbs. If we
reduce these complex powers into its distinct parts, and take
the attribute alone, without the affectio, then have we
particibles. All other attributives, besides the two species
before, are included together in the general name of adver-
tives; and thus it is that all attributives are either verbs,
particibles, or adjectives. Besides the distinction here
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 cease, to die. And lately
others have it in subjects which have nothing to do with
either motion or its privation; such are the attributes of
great and little, white and black, wise and foolish, and in
a word the several quantities and qualities of all things.
Now these last are adjectives; those which denote motions or
their privation are either verbs or particibles.”

“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,
threws very confiderable difficulties in the way of him who
attempts to analyze 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, disdif-
guishing them from every other species of words. Now it
is obvious to the sightful attention, that every verb, whether
active, passive, or neuter, may be resolved into the sub-
stantive verb is, and another attributive: for what is is of
the same import as is loving; and with amans of.

“But loving and amans are not verbs; whence it follows
that the characteristic of the verb, that which constitutes
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 affectio.

Affection therefore, or predication, is certainly the very
effence 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 in-
cludes, such as attribute, mood, time, &c. it may be possible
to express by adjectives, participles, and adverbs; but with-
out a verb it is impossible to predication, to affect, or deny.
any one thing of any other thing. The office of the verb, when stripped of all accidental circumstances, seems 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 coexistence." 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 substantive verb is, and another substantive, 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 this. And Mr. Harris thus explains it, p 88, "Previous to any possible attribute, whatever a thing may be, whether black or white, square or round, wise or eloquent, writing or thinking, it must first 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 rifes;" which means, when resolved, "the sun is rising."

According to this explanation existence is the primary idea of is; and Mr. Harris is little confident with himself when, in resolving active verbs into this and another substantive, he supposes it to mean affection. But let us deduce a more adequate idea of it from examples—God is good; His food was locusts and wild honey; If we be virtuous we shall be happy. In the first of these examples is connected good with God; so in the second it connects locusts and wild honey with food, and affirms, that with regard to John they were the same. In the third instance, happy is, by shall be, represented a quality of are. For this reason the following terms would be more appropriate than any other. The head 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 further, as appears from fact, the primary idea of is denotes affection, it follows that not affection, 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 justification of the subject and predicate being sufficient to supply its place. Thus μακαρία is ἄντονον, blessed the merciful. Here μακαρία, being placed by the side of ἄντονον, 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, Homo praecipue opus Dei, man the principal work of God, meaning man is the principal work of God. Thus also in Hebrew, "And Moses said unto the Lord, I am not eloquent, ἣν γὰρ ἐμοὶ θὰ λύσῃς; οὐδὲ παρακαταλείπῃς.  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, i.e. this shall be a token unto thee, iii. 11, 12. In this tongue, indeed, the substantive 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 substantive 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, so 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 association of ideas, to express not things, but their operations.

The conversion of nouns into verbs will be illustrated by an example in the Greek tongue. Mr. Jones, in his Grammar of that language, has shewn 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 six elementary principles, thus:

\[
\begin{align*}
\text{ἐγὼ ἦν, I,} & \quad \text{ἡμιοτέρω, were,} \\
\text{σὺ ἦν, thou,} & \quad \text{εἰσείσ, have;} \\
\text{ἐσύ ἦν, he,} & \quad \text{ἐμεῖς ἦμεν, they.}
\end{align*}
\]

Now let these in their corrupted state be annexed to any noun, for instance to ἡγιασμός, wine; and we shall have ἡγιασμοῖς wine; ἀγαπᾶτε, love; and ἡγιαστος, wine be; ἀγαπάτε, wine be; ἡγιαστοὶ, wine be; ἡγιαστεῖτε, wine be; ἡγιαστεῖτε, wine be. When the attention of the speaker or hearer was fixed on the first of these combinations, the union of the two words which signified himself 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 toasting 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 persons. This extension of the names of things to signify the actions which those things have been observed to perform, is, it is obvious, founded on the law of association, and may be illustrated by many inferences 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 which is the effect or object of the action, combine to express that action; but in other inferences, the name of the agent alone is sufficient to express its operation. Thus, "the ladies saw themselves," "the plumy people the falling verdure." Now having previously observed the use or action of the saw, and learnt in ourselves the effect of the eye, being also previously aware that in a simple direct pro-

position,
position, the second usually denotes operation, we should immediately infer that _can 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 *pronouns*, 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 *conjunction*, the connection of an agent and its object, or more generally the connection of cause and 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 *affection*, as grammarians have hitherto supposed, because no word expressive of this enters into its composition. The operation of a verb is indeed positive; and therefore that implication which writers on this subject call *affection* may be confided to belonging 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 afford, but this *affection* is lost in the *imperative*, *subjunctive*, and *infinitive*. So that if *affection* be essential to a verb, a verb can 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, suggests its _primary_, or 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 significations 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, _bada_ is air, and _air_ is the medium of existence; it gave birth to the verbs of being in most languages. Hence _bodai_ in Persian; _be_ in Anglo-Saxon and English; _eis_ in Greek, and the digammatized _eis_ in Latin, and _basi_ in Celtic. On the same principle the Hebrew _yishp_, or _yish_ or _yishp_, is the parent of our words _are_, _are_, and of the Latin _eris_, _eris_. To do is to put forth power: and this, with other verbs of the same kind, are borrowed from such objects as put forth their fruits, such as herbs, trees, the earth. Thus, _tath_, the grass, gave birth to _tath_ to produce. Hence such phrases as _tath_ _tath_, to produce fruit; _tath_ is the oak; and hence _tath_ to bring forth as the oak; _tath_ the bee, hence _tath_ to yield fruit as the bee; _tath_ means a flower; hence _tath_ or _tath_ to offer or sacrifice. In Chaldean _rit_, _rit_, is the earth; hence in Greek _tath_, _tath_, and our verb _work_. In the same way _tath_ _tath_ to give, yields, is the real source 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 process 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 abstract noun. In this state the preposition to is prefixed to it, and its use is to be ascertained from its etymology. In Arabic _yath_ is a verb which signifies motion to a place or object. Hence in Celtic (_yath_), it became a preposition denoting an end, or the point to which motion tended. In passing to _Persian_ it dropped the initial vowel, and in the form of _yath_ it denotes, in _Persian_, 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 form 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, or converted by abstraction into a species of verbal 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 learning. He commanded me to tell you, he commanded, and the object which that command respects, is, that I should tell you. This explanation appears jilt, from the circumstances 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 please, i.e._. I use the plough, or act the plough.

Let us next see what Mr. Tooke says on this subject. "The preposition to," says he, _vol. i. p. 350_, "is the Gothic infinitive particle, or _tun_, i.e. _at_, _of_, _to_, reflexive, _conjunction_. Which verb of the Gothic infinitive is, indeed, itself no other than the first participle _tun_, or _tun_, _tun_, of the verb _tun_, _tun_, _tun_. And what is done is _terminating_, _ending_, _finiting_. After this derivation, it will not appear in the least mysterious or wonderful that we should, in a peculiar manner in English, prefix this same word to the infinitive of our verbs. For the verbs in English not being distinguished, as in other languages, by a peculiar termination, and it being sometimes impossible to disfigure them by their place, when the old termination of the Anglo-Saxon verbs was dropped, this word _to_, i.e. _at_, _of_, became necessary to be prefixed, in order to disfigure 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 _t_ and a _d_ is so very small, that an etymologist knows by the practice of languages, and anatomy, by reason of that practice, that, in the derivation of words, it is scarcely worth regarding. And, for the same reason that _to_ is put before the infinitive, _do_ used formerly to be put before each other part of the verb which likewise were not distinguished from the noun by terminations. 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 distinguishing termination is used, then the distinguishing _do_ or did must be omitted, the termination fulfilling its office. And, therefore, we never find—I did love, or_ he_ did love. But I did love, _do_ doth love._

It is necessary briefly to expose what we conceive to be the fallacy and absurdity of this reasoning. To, in found and tense, is the farthest possible from the Gothic _tun_, which is only the Greek _tun_, or _tun_, the true original of _to_ being the _Persian_ _tun_, which has precisely the same meaning with it. This altogether unnecessary to prefix the _t_, in order to distinguish the verb from its corresponding noun, because this is done by the context, or the collocation of the word; 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 it may be made the subject or object of discourse; and, in Greek, it admits of the article before it, as nouns do; and in all instances what
ever, an abstract noun, where such exists, may be substituted for it.—I defire to learn, i.e. I defire learning.—To excel in learning is honourable, i.e. excellence in learning is honourable. So then, according to Mr. Tooke, to 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 be dobth love, instead of be dobth loath, is not that the termination supplied the place of to, but because love and love are one a verb, the other a noun, which last does not admit such a termination.

The conversion of to into do, so as to become a verbal index, is a cunct 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—dare operam, to put forth exertion, 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. Cuming, p. 85, of the infinitive to love, is, doubtless, the same as do love, thus denoting the simple energy of the emotion, signified by the noun, and tbe kindred letters, and easily convertible. To love, therefore, means all loves, do loves, the word do or to inverting the noun with a fort 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 half sentence is a just 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 invest the noun with a fort 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 Encyclopedia, p. 31, following the track which Horne Tooke has pointed out, thus adds: "The infinitive mood, as it is commonly called, is the verb divided of its peculiar force, viz., of affirmation, and uncompounded with those words which render it expressive of person, number, &c. 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 state of the word, with a termination added to it, to shew that it is to be employed as a verb. Thus, in the Anglo-Saxon than, the is the fundamental form of the verb, and an is the verbalizing 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 faction 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 principles to account for the phenomena of language. Mr. Tooke, alluding to the ancient Stoics, thinks the past finite form of the verb to be the infinitive, and yet agrees with his followers in making affirmation or affection to be the essence 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 perfect state when without its essence. Again, the infinitive is here not improperly called the noun finite, i.e. an abstract noun, with the prefix to in our tongue; but in the Anglo-Saxon with the suffix an, to shew that it is a verb; and as this is a new idea, an, in a new language, is called the verbalizing 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), e., which is the same without the change of a letter. We have this further evidence of the derivation of the nominative from the Greek, in this respect, that in this latter the infinitive, instead of being the fundamental form of the verb, is, by corruption, derived from the infinitive. Thus, γίημαι was the old infinitive; γίηήμει was also the imperative; but the final being, by degrees, dropped, it became γίηήμει. 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: γίηήμει, γίηήμει, etc. And the position, that the variations of infinitives may be traced with advantage from the Latin imperative, is a fact, which is contradicted by that broad analogy by which the Latin verbs are formed from the present tense. It is worthy of remark, that the old Greek accords with the Hebrew, where the imperative is the same with the infinitive, and succeeds it in the paradigm of verbs. We shall only, on this subject, express our surprise that, if these sensible men were deceived by adopting the notions of Mr. Tooke, they were not repelled by what appear to us to be contradictions. This grammarians gravely tells us that deliberate art had no concern in the formation of language: yet, in examining its phenomena, he recours to minute mechanism and petty artifices, which, as being unwilling to allow the agency of a rational law in the human mind, he calls the contrivances of language.

We now proceed to consider briefly the usual divisions of verbs into active, passive, and agent; 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 dever verb. There are, indeed, verbs which denote rest, or the cessation of motion; but we cannot use even these without connecting them with positive ideas; and as action is necessary to destroy or support action, we can revive all apparent neutral into active verbs. Thus to stand, is to cause to stop; to fleep, is to enjoy repose; to sit, is to hold one's seat. 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 action; 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, ille amat parentes, he loves his parents, is the same in sense as parentes amant 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 agent, becoming the subject of the verb, is put in the nominative, and the object in the ablative. An agent, while it acts, is acted upon. Every active verb, therefore, has the compound base of active and passive. Thus, in the above sentence, he loves his parents, the first part, he loves, is active; the subj, loves his parents, is passive. In the same sentence, converted into the passive form, his parents are loved by him: the first part is passive, and the last active. In the infancy 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.
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 substitute it to the connecting verb in the same mood and tense, and annexing the agent with its correlative preposition in the subject, the case. Thus, we worship God, becomes God is worshipped by us. Hence it appears that verbs which are transitively active can be made passive, because they have as object, which, in the passive form, is made the subject of discourse; 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 discourse being combined with the personal pronouns in the active case. Thus, ἔγω ἦμυ, house for me, which do not, as before, coalesce as a subject with an agent; but as a subject with the person to whom it belongs, and for whom it was intended. Hence their combination came to convey the idea I am house, I am built: for the auxiliary am serves only to affect that house or built belongs to the pronoun preceding it, and to cement their union in the mind as subject and predicate. In the same manner, if ἔγω, we, be annexed to the word ἐποιησα, we have ἔγω ἐποιησα, ἐποιησα τοι, house for thee, house for him. And these contractions, by flight changes, became ἔγω ἐποιησα, ἐποιησα δε, ἐποιησα τοι, I am built, thou art built, he is built.

A verb, if its operation paves 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, as being, pósile, continuance, and tending 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, posture, and the like, because we can measure duration, or even rest, and privation of motion, only by ideas consequent on motion. Thus, in our own tongue, a "diligent boy will become a learned man." "By thee dispised into congenial soil, flows each attractive plant," i. e. it is dispised. So in Latin, "Quam placidus ventus fierat mare," when the sea flood (i. e. was continued) tranquillizes the winds. Venetian lecher, the will come milder, i. e. will be or become milder. Vixisset unmundus fus, he would have lived, i. e. he would have become a filthy pig. Ego incedo regina, I walk a queen, et. i. am a queen. Theoritius, speaking of the infidelity of Pan, writes καὶ ἐποίησα χρῶν ξείαν ἐπὶ μοι, kean 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 σαυρα, in Greek, as implying continuance or posture, came to have the sense of am — ἔγω, ἐποιησα, I am well; and that am, I am, and ἔγω, I go, were originally the same. And in Latin one became, for a similar reason, into sese, which occurs in Lucertus in the sense of of. From here the Italians have derived séciere, to go out, end, and sēcino, exitus, a door, or avenue. Hence we have derived to take. The Italian flauto, been, owes its derivation from stam, 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 differenced in all grammars, (see L. Murray's valuable Grammar of the English Tongue; Dr. Crombie on Etymology and Syntax; Dr. Priestley's Philosophical Grammar, and particularly Mr. Dickbourn's excellent Dissertation on the English Verb,) we shall content ourselves with a few observations. Mr. Tooke, vol. ii. 473, 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 allowance 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 past, is certain, absolute, and unconditional. This certain, absolute, and unconditional form is essential to the verb, and it constitutes that mode or manner called the indicative mood. As the indicative mood respects the past time, or the subjunctive, in respect to it, regards the future. And as future events, at least with respect to man, are uncertain, relative, and conditional, all verbs, expressing an uncertain, relative, or conditional tense, are in the subjunctive, so called from its being subjunct. to a verb in the indicative. All verbs, moreover, expressing an end or intention, as being from their nature uncertain, are used in the subjunctive, and for this reason it might be called the final mood. In this view it has a close affinity to the infinitive, which, as we have already observed, is only an abstract noun with the preposition to, denoting the end or object to which the preceding verb is directed. Accordingly, they may be substituted one for the other, in all instances. Thus, I desire to learn; I desire, the object of my desire being learning; 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 person to command himself. Let me love, then, is not the self but the second person, as may appear by substituting permit for its equivalent let, Permit 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 feeling or consciousness coalesce 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 often used in an extended sense, to comprehend all time, present and past. As, the sun rises every day; birds fly; truth is always one. In these and similar instances no reference is made to the future; unless the future, by association, indistinctly in our minds coalesce 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, for 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 extension of the verb by distinguishing terminations to express the divisions of time. And here we cannot help observing, how improper it is to call tense, and
and similar contrivances. 

The formation of the tenses 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 

The Greek has been represented as very like the Sanscrit; but in truth, the old Hebrew 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 ęs.

Thus 

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 affection. Now if we take away the affection, and thus destroy the verb, there will remain the attribute and the time, which make the essence of a participle. This statement has conciseness and simplicity to recommend it, though we do not regard it as correct. Mr. Tookes gives us the following account of participles. "This fort of word is by no means the name with a noun adjective. The participle has all that a noun adjective has; and for the same reason, viz., for the purpose of designation. But it has likewise something more than a noun adjective has; because the verb has some thing more than the noun. And that something more (as Perizonius proceeds to assert) is not only the designation of time, for every verb has a signification of its own, distinct from manner and time. And language has as much occasion to adjective the distinct signification 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 signification of the simple verb, and the verb with its mood, and the verb with its tense. I shall at present notice only one of these verb-adjectives, which we now employ in English, viz., the simple verb, itself adjective; two adjective tenses, and three adjective-moods.

"We had formerly in English only the simple verb-adjective, and the past tense 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 tense active adjective. As the noun adjective always signifies all that the unadjective noun signifies, and no more, except the circumstances of adjective; so must the verb adjective signify all that the unadjective verb signifies, and no more, except the circumstances of adjective. But it has been usual to suppose, that with the indicative mood, as it is called, is joined also the signification of the present time, and, therefore, to call it the indicative mood present tense. And if it were so, then indeed we are considering, besides the signification of the verb, must likewise, adjoin some manner and the present time; for it would then be the present tense adjective as well as the indicative mood adjective. But I deny it too 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 surprise; and we shall endeavour to let 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 closer 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 nunation, or the syllable en added to the verb; and this is the Greek participle in en, which the Latins have converted into ens; but which we, by giving a natal found, have corrupted into eing.

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 chafes 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 doer, or a person who acts; as i.e. to write, he is writing, the writer; aman, 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 tenses— I am writing—he was writing—they shall be writing.

Farther, 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 associated
“Qui leet eloquio fidum quoque Neflorae vincat
Haud tam eflfict, defertrum ut Nelfora crimen
Nulfum effe vor.”

Here also the adjective or participle *defertum* is taken
verbily, and the general notion of *defection* contained in it
is modified or rendered particular, by being joined with the
substantive *Neflorae*. The meaning of the passage is, “I will
never be induced to believe, that the defection of Neflor was
not a crime.”

*Defertum* to be taken directly as an
adjective, qualifying its substantiue, the sentence must be trans-
lated, “I cannot believe that Neflor deserted was not a
crime.”

But it is evident that this is nonsensical; as Neflor,
whether deserted or not deserted, 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 feemingly blames himself, which is this: instead of
the adjective qualifying its noun; the noun inverely quali-
ifies 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 *liberatam*, though they here con-
flate or unison, ill retain their original character of a
substantive, and the historian has apprized his readers of this
character by the *collection*, where *condita* is rendered promi-
inent and emphatic by preceding the qualified *urbe*. The
same observation applies to *defertionem Neflorae*, which is equiva-
lent to *defertionem Neflorae*.

As the past participle expresses the effect of an operation,
which it has been called the *passive participle*; but when the subject
of an operation is a moral agent, that effect is *hails*, or a
voluntary principle of action. And thus it is, that the per-
fecr participle often expresses or implies action; as, *admi-
ratus*, having admired; *beatus*, having spoken.

Sometimes in Greek and Latin it conveys a reflex sense: as *flatus mem-
bra*, having protracted his limbs; *πιθανον* καί *προσανοικα*,
having the gospel entrusted to me. And lastly, as the perfect
participle is derived from a past verb, and, as it signifies an ef-
fect already produced, it points to time past; nevertheless, as
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 Propositions.*

Mr. Harris defines a proposition to be a part of speech,
devout itself of significatiue, but so formed, as to unite two
words that are significant, and refuse to coalesce or unite of
themselves. This definition is undoubtedly erroneous, and has
been juftly censured by Mr. H. Tooke. We venture, how-
ever, to affirm, that the account given by the late-mentioned
writer, is by no means such as a philosopher, who accurately
understood his subject, would give of propositions. “As the
necessity, says he, vol. i. p. 319, of the article, or of some equi-
vals, follows from the impossibility of having in language a
distinct name or particular term for each particular indi-
ual idea; so does the necessity of the *proposition*, or of some
equivalent invention) follow from the impossibility of having
in language a distinct complex term for each different col-
lection of ideas, which we may have occasion to put together
in discourse. The addition or subtraction of any one idea
to or from a collection, makes it a different collection; and if
there were degrees of impossibility, it is still more impossibil-
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 proposition employ-
ed.
ed, by whole aid complex terms are prevented from being infinite or too numerous, and are used only for those collections of ideas which we have 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 shrink 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, in the above instance, only a conjunctive sense: as, a house and a party wall, i.e., a house add a party wall, or, as Mr. Tooke explains, with a house join a party wall. The following we deem a more just representation. Prepositions express the relations of things; and, as our ideas of relations are associated effects, arising from our ideas of things, so the words expressing relations are borrowed from the things related, that is, prepositions originated in nouns and verbs. But we have seen, that the relations of things are also expressed by cafe. Caeis, 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 different senses. The three leading relations we have farther seen expressed by cafes, are beginning, instrument or medium, and end. Tho prepositions, then, which signify beginning, require the noun preceding them to be in the original state or position, or, agreeably to the usual language, govern the genitive cafe. Tho signifying instrument or medium govern their dependent nouns in the inessential or meditational; as it is commonly called, the abstract cafe: 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 daive cafe.

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 unproper in regard to the use of prepositions, is mislaid in almost every instance, in respect to the sources 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 corporal 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 deserving 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 primary 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 corruptions, 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 systenm; and not only in his own opinion, but in the opinion of the public, he lies so strongly fortified, that no adversary can dislodge him. We shall, however make an attempt for this purpose.

"I imagine, says he, p. 367, that of (in the Gothic and Anglo-Saxon of) is a fragment of the Gothic and Anglo-Saxon era or era, folouet, offspring, that it is a noun substantive, and means always confluence, offspring, succession, or follower." Now as to era it is nothing but the Greek παρα, produce, from παρά, and the meaning of of is quite the reverie of confluence, &c. Thus, in the phrase rays of the sun, of points to the sun as the origin of rays. It means, therefore, source, origin, and its derivation is ἡπατος, from παρά, &c., which explains, further proves this, Solis radia, where it, annexed to sol, surely does not mean that the sun is a confluence 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 is put before that which proceeded from it, and this is the reason why in English we always say father's house, (father is house,) and never house's father's, having copied not only the genitive termination of the third declension, but also the collocation of the noun affected by it. Moreover, not of but after came from the Gothic era, because this, meaning offspring, came also to denote succession, or that which comes after those who gave it birth. And in the Gothic it is used as a preposition signifying goal, after, where the t is introduced to humour the pronunciation, as is inserted in xwto; for xwto, or xwtes.

As of means beginning, it has the same sense with from; which hath Mr. Tooke derives from the Gothic and Anglo-Saxon frum, meaning feb, beginning. This may be admitted, but whence did from originate? The Latins, it is well known, converted the Greek termination into m. Thus the accutative w becomes in or om; the genitive plural wo, am, and the neuter ending o, is also om in Latin. On this principle παρα is the parent of primus. This half the Goths of Wallachia, where, as Michael observes, a Latin colony had been planted, and which later, after thus blending with the Latin, is the only specimen of the Greek preferred in modern days, have borrowed and corrupted in the form of from, which retains the original sense of ininitum, principium. But we are not yet arrived at the origin of the word. The Arabic ىى, place, among other meanings, denotes the head of a family; which being rendered more general and abstract, gave birth to the Greek παρα, πρα, to the Latin pre, to fra in the Icelandic, Norf, Danish, Swedish, to fray in Frich, and free in Scotch. And thus the Arabic origin of the word accounts for the different forms of from, fra, fre, from in the Northern dialects, the fifth being derived through the medium of Greek and Latin; the others immediately from Aby. Mr. Tooke happens to be right in the meaning of from, merely because the Gothic corruption of from has correctly retained the original sense of primus. He thus illustrates its signification. Figs came from Turkey; lamp falls from ceiling; lamp hangs from ceiling. Figs came, beginning Turkey, that is, Turkey the place of beginning to come. Lamp falls, beginning ceiling; ceiling 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 cane 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. Cane, 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, stand opposed to, till, and for. Mr. Tooke might, with equal propriety, derive to from his own name, as derive it from the Gothic tungan, to act, which is but the Greek προερχόμενος, to fabricate. Equally absurd is it to say, that the Latin ad is from αύτον. The parent word, as we have seen, is the Arabic ᶢsetColor, ato, to move in a thing. In Celtic, the word has preferred its original form (ad), in the exact sense of to. But in Persian, losing the initial vowel, it became τσα; whereas, in Latin, retaining the first and dropping the last, it exists under the form of ad, and in English under that of to. To and at have a signification corresponding to their kindred origin, the former denoting the object of motion, 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 you will observe, that the coalescence of these two words to, 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 morn,' the word time is omitted as unnecessary. So we might say, From Turkey to the place called England, or to place England," p. 363. But while, or, to state it is in the Anglo-Saxon, while, does not mean time but a period, or revolution of time, such as a day, week, &c. and is derived from the Hebrew יָמָּה, yam, or yăm, to revolve, and year, or, as our ancestors spelled it, ear, is derived from יָמָּה, or in Greek μήν, месяч. The Hebrew word also is the parent of our wheel. To point to a final object either in place or time, while till, in strict propriety, is applied to time only, and is derived from יָמָּה, יָמָּה, יָמָּה, to revolve, and was at first expressive of the rising sun. Thus, 'I will wait till morning,' I.e. I will wait the rising morning. 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 infensible of a blessing, till (or until) we lose it," then, "we are sensible of it," is a clausule implied. "They will stay till morning," and they will then depart, is to be understood. Till exists in the Cimbrian language, and this is an additional proof, that the uncouth compositum while is a mere fiction of Mr. Tooke.

Mr. Tooke takes for to signify cause, as opposed to of, signifying conformance, from the Gothic substantivum feeins, a cause, p. 267. He thus illustrates them, I am sick of my husband, and for my gallant. Love makes her lack of and lack for. Here of and for seem almost placed in opposition. At least their effects in the sentence are most evidently different: for by the help of these two prepositions alone, and without the aid of any other words, she expresses the two contrary affections of loathing and desire. Her dishabill was the offspring of her husband, proceeded from her husband. Her gallant was the cause of her love. But if her dishabill proceeded from her husband, he was the cause of her dishabill; 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 conformance. But in truth, the matter is just the reverse of what our grammarians represent. Of means cause or origin, and for means conformance or end. She is sick of her husband—he is sick, her husband is the source of it—she is sick for her gallant, and the object to which the looks with desire is her gallant. Accord-

ingly, for always supposes the attention not directed back-
tacical or far-fetched etymology, when I have placed before you at one view the words employed to signify the same idea in those languages to which one'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 it is worth noticing here, that the Greek, to which the Gothic has in many particulars a considerable resemblance, employs the word φυλάκιον (or φυλακίον) for "door." All this is very specious, and being confidently advanced, it has the aspect 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 durch or durh, &c. This uniformity in retaining a guttural, shows that a gutturale was an original part of the word. And it is no other than the Hebrew, 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 this I am convinced. The general term warms through the air; the general term warms; the median or passage by which it does this, is the air. We shall only add on this subject, that the prepositions above, beneath, exist in the Arabic, with little or no variation, and in the same sense; while among is the Persian meanc, in the middle, the name with the Celtic mecan. In the Hindoostanee it is founded on a nasal gutturale, as written meng, and by the same analogy that mid became amid; love, above; bout, about; meng became among. The corresponding word in Hebrew is הָלַכְו (halakah), to invert, which means separation, definition, an idea the very reverse of that contained in mecon, 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 בָּלַכְו (balakah) or (written with the nunation bavo) is the parent of the Anglo-Saxon between, within. The Greek ὑποτάσσω (hypotassō), to overturn, is in Latin revert, to turn, which the Anglo-Saxons have further corrupted into a word, turn. Hence, in the form of word it came to signify the object to which the attention is directed; as cafjward, i.e. r. egat preljpc. We add only the genealogy of over, Anglo-Saxon afer; Greek ἀπόστημι, Hebrew נֶלָכְו (nolakh), to pass, or pass over.

We have already observed, that Mr. Tooke's adscription of the nature and use of prepositions belongs more properly to the conjuctions. But we ought rather to say 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 conjuctions serve to propose or to compare our ideas, to combine or to separate them; and this is entirely independent of the number or variety of complex terms. If the complex terms 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 composition. Indeed what Mr. Tooke says on this subject is indelinit, inappropriate, and even nugatory; though some subsequent grammarians have gravely copied his reasoning as omneal wisdom.

The prepositions and conjuctions 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 deduce words of this kind from verbs and nouns in the parent tongue, while the same words exist in that tongue coeval, and in many influences antecedent to the nouns and verbs represented to be their origin. But whence came those conjuctions and prepositions to the northern language? We have anticipated this question by proofs from fact. These 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 subordinate 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 those particles including adverbs, prepositions, and conjuctions, are derived. The verbs, from signifying in the Arabic dialects the action 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 conjuctions; and they were hence propagated, with still further corruptions, into the Gothic, Anglo-Saxon, and other European dialects. Lofing 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 dissipated the mist, by asserting 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 instance 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 bables, 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 a barbarous people, to 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 deliberate 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 conjuctions.

<table>
<thead>
<tr>
<th>If</th>
<th>Of their respective verbs</th>
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<tbody>
<tr>
<td>An</td>
<td>GIF, to give</td>
</tr>
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</table>
| Undefs | An-
| Eke | An-
| Yet | On-
| Still | unf-
| Elfe | on-
| Though | unf-
| Ditt | unf-
| Ditt | unf-
| Without | unf-
| And | unf-
|  | of | |
|  | Anad | Anad |

We will briefly examine thefe. Skinner, before Mr. H. Tooke, has derived GIF from the Anglo-Saxon geum, 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 gifum from the Hebrew, Arabic, and Persian word "GIF, the
Now the action of the hand is two-fold, to
give or to receive. In the latter sense it has paled into Latin,
and produced capio, capere, and even habere, meaning to hold; in
the former it has given birth to the Anglo-Saxon verb gif, which
signifies the action of the hand in imparting. Our word gift
is apparently of the same origin, meaning to hold.
Mr. Tooke observes, that gin is used in our Northern
countries, and by the Scotch in the sense of gif, and he juttly lays,
that it is only a contraction of the participle given.
Ae, used by old authors, means gif, as in the following
lines, quoted by Johnstone:

"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 anan, to grant, which is only the Latin annuus, to assent
in law; whereas an is the Arabic particle "ن", which is
pronounced as if written in, when meaning gif. We borrowed it
from the Gothic, where it is employed, as it is also in Latin,
to mark an interrogation. The derivation of unles, or, as it was formerly written, unles, from un-leis, seems to first light not to be disputed. The application of the Anglo-
Saxon unles does not appear forced; as Troy will be taken, unles the palladium be preferred, i. e. Troy will be taken,
diffused, the palladium be preferred, or, diffused that circumstance,
namely, the preferment of the palladium, and Troy will be taken. And yet we are persuaded that this is not the true interpretation of unles. 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
unles is interpreted by lys, un-leis fe, un-leis, falsowe, and it has no other meaning; and in this sense it is incapable of solving the difficulty—"Troy will be taken, unlesed the palladium be preferred," which is hardly sense. Mr. Tooke acknowledges that the Anglo-Saxon writers have not given us instances of orles in a conjunctive sense: "but, instead of it,"
adds he, "they frequently employ synthe or nythle, which is evidently the imperative nyth, or nyth, or nythna, or nytha, to which is subjoined the, i. e. that; and nythle, take away that, may very well supply the place of orles the, re-
expressed or underlaid, diffused that. But nythle signifies not merely to take, but to take counsel, it being derived from the Greek νυθε, to consult or deliberate; while the Latin tempus is γυθε, by law, by right, rightly, truly: lese is a secur-
y by law, and unles, we conceive, is a corruption of unlesed, i. e. unexpressed, unsecured. Thus, Troy will be
 taken, unlesi the palladium be preferred, i. e. it being unpro-
vided, 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 les, the imperative of lese, which has the same meaning with on-lese is like-
wise used by old writers instead of unlesi as, "But will not hide
there les yourself do bring him."

To this he joins, in a note, p. 173: "It is this same imperative les, placed at the end of words, and collocating with them, which has been
given to our language such adjectives as hoples, raples,
deathles, motionles, &c. i. e. diffused hope, rell, death, motion." But les, we think, which, though not in a comparati-

form, conveys a comparative idea, is the offspring of the Greek λεσ (as little is of λεπ) both signifying small, slender. From denoting something minute, it came, as the Latin minus, to express negative. On this principle, a less
left night, meant at first not absolutely a night without sleep,
but a night having less sleep than is necessary, or less than

usual, though in time it came to convey absolutely a negati-
ve idea. Hoples without hope; broaples, being to bottom; and we appeal to our readers whether the explanation be not more simple and natural than differs the bottom. If this
derivation be just, left or lef is not the part participle of life,
but a contraction of left, the analogical ablative of life, and it forms the lef leaf of the sequence that follows the preceding clause; as, "Let those who fland take heed lest they fall," which means, let those
who stand take heed; if not, they will fall, and that is the lef leaf that may happen.

Eke, and, in the Latin ac, is ultimately derived from the Greek αεί, or as it is in Latin aeternus, to endure, though it may come more immediately from annum, the Anglo-Saxon offspring of αεί. An observation of Mr. Tooke goes cer-
tainly to prove the latter, if we can depend on its correc-
tions. "In each language," says he, "where this impe-
rative is used conjunctively, the conjunction varies just as
the verb does. In Danish, the conjunction is ης, and the verb
eger. In Swedish, the conjunction is ecb, and the verb
acker. In Dutch, the conjunction is eck, from the verb aekcn.
In German, the conjunction is aucb, from the verb aucb.
In Gothic, the conjunction is ecb, and the verb is aucb.
"This example serves to show how nearly allied these
languages are one to another, and how a large portion of them
is derived from the Greek and Latin.

Tal is affincerely the Anglo-Saxon get or gut, adlice, anon, though Mr. Tooke has referred it to the verb to get. This grammairian seems not to have sufficiently studied those ana-
logies by which the genius of a language is formed. The
Anglo-Saxon, delighting in guttural, forms many of its
words by prefixing the particle ge, or the letter g. Thus,
gcry, pridin, is only the Greek γεω, with ge; and
gmung 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 σε, in Anglo-Saxon is
corrupted into geta, get, or gut. The Anglo-Saxon fitlen, the
German fitlen, the Swedish fitlen, the Danish fille, originated in the Greek φάλλη, which denoted first to lay
down the fail of a ship. Hence in the above mentioned
modern tongues, it came to signify, to place, compense, or
adjoin: but the general consequence of putting down the
fail is to give filling or tranquility to the ship. Hence
φαλλη gave birth also to the Anglo-Saxon fitlen, and the
English to fell, and to the conjunction fell. The
Anglo-Saxon and Gothic used it conjunctively in the form of fillis, or filthe, and its immediate parent undoubtedly is fillan, and not fillan, as Mr. Tooke would have us believe.

Elfs, with no less certainty, is the Anglo-Saxon elles, the
Latin elia, and the Greek αέλλος, and has nothing to do with
delea, to destroy, and it means not exception or exceptions, but a change or difference in the consequence, or to the condition

of what is expressed in the preceding clause of form or con-
tection. Thus, let the derivation be just, elf it will not be received, i. e.
otherwise it will not be received: let the derivation be just;
if otherwise will not be received: let the derivation be just.
Mr. Tooke's principle the solution stands thus: let the deri-
vation be just, diffused it will not be received, an interpretation at once unnatural and unmeaning; and in order to give it
the appearance of sense and cohesion, he is forced to sup-
pose a change understood. Let the derivation be just, diffused
the derivation being just, or diffused that circumstance, it
will not be received: see his resolution of such examples as

vol. 1. p. 247. The conjunction αέλλο, like αέλλο, is a modi-

fication of the pronoun αέλλο, another, and may be re-
solved in the same way as e£e in English.
GRAMMAR.

On the conjunction although, or though, we quote the following remark from the learned Dr. Jamison, in his Etym. Dictionary. "Mr. Tooke derives though from the Anglo-Saxon *thafian, or *thaipan, to allow. But there is not the same evidence here, as with respect to other such conjunctions illustrated by this acute and ingenious writer. It certainly is no inconsiderable objection to this hypothesis, that it is not supported by analogy in the other northern languages. In Anglo-Saxon, *thaf signifies though, Alemanic *thach, Icelandic *thak. I shall not argue from Moes G. *thaun, in *thaudaka, which Junius views as synonymous with *though; because this seems doubtful. In old English *thauf was written about 1264, see Percy's Reliques, ii. 210. which nearly approaches to the Anglo-Saxon *thak. Instead of *thob we find *teb, *alteb. This might seem allied to the Icelandic *teobt, quamvik, which, according to G. Andr. is per *teob, *atheb, &c.; Lox. p. 265. But it is more probable, that our term is merely Anglo-Saxon *thobe. Moes G. *thahtab, cogitabat, or the participle part of the verb from which English think is derived; as in latter times preserved, &c. have been formed. Revolve *alteb, and it literally signifies "all being thought of," or taken into account; which is the very idea given by the conjunction. The Synon. in German exhibits some analogy; *dachte, being the imperfect and participle part of *denken, although, may have been formed from the same verb. "Though this etymology be plausible, we do not agree with it, merely because a more just and simple one may be pointed out. Although is thought combined with all, as in the verbs albeit, alone, (for all cases) alone, at one. And though means not thought, but concession or allowance, and is derived from the Greek oblique δυναμίν, to give, to grant; and as this verb is δύναμιν, or δύναμιν, (which gave birth to the first aorist δυόναι) so this derived conjunction is *tho or *though. Its resolution may thus be illustrated: "Though the book be long and tedious, I will read it with attention: be it granted, that the book be long and tedious, I will read it with attention." It is observable, that in its simple form the word is hardly capable of being explained on Dr. Jamison's principle. "Be it thought that the book is long and tedious, I will read it with attention," whereas, on our hypothesis, the compound form is easily susceptible of illustration. Be it all granted, that the book, or grant that the book be all long and tedious, &c. It is observable that the word has spread as is seen above, from the same root into all the kindred northern tongues. So has indeed to think, but this comes from δυναμίν, to express, which in its derived form was naturally employed to denote the operation of the mind in supplying the materials of discourse, i.e. in thinking. The noun δυναμεία is also the parent of our word thing, which signifies any object that is the subject of thought. We only add that the Anglo-Saxon *thafian is certainly of the same origin with *though, the guttural *th being corrupted to the labial *f in the orthography, as well as in the pronunciation.

Skinner's account of end is this. "Necio an a Lat. adhive, q. d. add interjicia per opecentih n, ut in render a redendo;" which we think a more proper etymology than that of Mr. Tooke, who derived it from annunud congrus dare, a combination and a sense of his own invention. But this word exists in Anglo-Saxon and Gothic, not only as a conjunction but as a preposition combined with words. In these characters it signifies connexitum, union, reciprocation, or opposition; and these significations demonstrably flowed that its origin is the Greek ανων, to similar to it in found, and precisely the name with it in sense. When one person or thing meets another to unite or co-operate, ανων, expressing this
this union, or co-operation, is the copulative and; but when a
perfon or thing oppofes or counterfefts another, or, in the
form of and, is combined with another word to express again
or in return, as embayed, a word is return for a word; i.e., an
envelope; and, again, the fun, etc. Hick's Anglo-Saxon
Grammar, p. 27. When objects act upon the organs of
fence, the mind is fuppoled to return to act upon the
impressions of thofe objects in order to perceive them, and the
perception fo acquired is called in Greek συνέλευσις. Hence, in
Anglo-Saxon andgif, if we attend to the com-
position of the word, means that fence 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 fentences, as out of
two to make two fentence. Thus, you and I and Pater
tude to London, is one fentence made of three. But this
notion Mr. Tooke refutes by the following example: two
and two are four, A B and B C and C A form a triangle.
John and Jane are a handfome 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 fentences, and
their office is to combine the words fucceeding to the
words going before them, i.e. to combine a verb coming
after with a preceding verb; a noun coming after with a
preceding noun, an adjective coming after with a preceding
adjective, &c.

Mr. Tooke has not given the etymon of then, though it
exists only in Anglo-Saxon under the form of thanes, and in
Gothic under that of thana. But in order to come at its
origin, we muft attend to the effect which external objects
produce on the organs of fence. When two qualities, un-
equal in degree, are compared, that which exceeds appears
to receive by means of the contrast an immediate augmen-
tation; while on the other hand, the lefs seems to diminish.
This is the cafe, and human nature being the fame in
all ages and countries, the fame form of exprefling the
degrees of comparison has obtained in all languages.
Thus in Hebrew tab min kheruf, good from gold, i.e. bet-
ter than gold. The Arabs borrowed the Hebrew min to
exprefl their comparative; and the Perfians denote it by
αι, a word of the fame import. The Latin tongue in
this inftance is founded on the fame general principle—
Clarius fols, brighter from the fun. The French de and the
Italian di are taken from the Latin de; and as the ufe of
cafes in these languages has for the moft part given way
to prepositions, they exprefs their degrees of comparison
by thefeparticles in the fentence of from. In our own tongue
the mode of exprefling the comparative feems alone unim-
telligible. But by tracing then to its root the mystery
vanifhes; and we recognize the fame great principle of
nature. The imperative of the Hebrew תונ, mittan, which
given birth to correponding verbs in all other lan-
guages, is תונ, than, which is precifely our English than,
retaining not only its original found, but moreover its
original fene of give, put, place. Thus, his face was brighter
than the fun.PUT the fun (namely by the fide) his face
was brighter. Lighter than gold. PUT gold, it is lighter.
From the juxtapofition of gold it becomes lighter; or
as in other languages lighter ftrong gold. I fhall only add
that son, from, of the Germans, is a corruption of the He-
brew תונ, min or mon, m, b, q, being interchangable
letters. Accordingly the Germans fay in the fuperlative, der
felbe son feinem brudern, the fift from his brothers, the
belt of his brothers.

It fhall remain that we notice the adverbs and interjeftions,
but as we have already occupied fo much of our readers at-
tention in difcufsing the other parts of fpeech, we fhall dif-
patch thefe by one or two general remarks. Adverbs, or as Mr. Harris defines them, attributes of a secondary kind,
are corruptions from nouns, adjectives, pronouns, and verbs.
The name of adverbs given to fuch corruptions is not, it
fhould be observed, defcriptive of their nature, as diftinct
parts of speech, but of their ufe in modifying the verb or
adjective to which they are annexed. Adverbs are often a
fub litate for a whole clause, as here, for in this place; then,
for at that time. In this view, adverbs are the only words
which properly come under the denomination of adverbial,
and, in the form of which Mr. Tooke is fo fond, and to which he
improperly refers several other parts of speech. As to inter-
jedtions, it may be questioned whether or not they can be
considered as articulatc sounds, though they have been ufually
honoured with a diftinct department in language. One
consideration, however, is calculated to leave them in posfeffion
of their hitherto enjoyed honours. Interjeftions, it is true,
are not diftinct names of our feelings and affections, and there-
fore they have not, like other words, derived articulation
from the association of fence with found; nevertheless they
confin of certain exprefions or cries, which, as founded in na-
ture, are as well calculated to recall to our minds ideas of
certain emotions, as if, like other words, they had been by
common conflent made the figns of thofe emotions.

Grammar is als0 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 Judah Ching, which is commonly held the firft Hebrew
grammar that appeared; though it is certain, rabbi Saadias
Haggaon, who lived before rabbi Judah, composd two works
of the fame kind: one expressly of grammar; and the other
of the eglencies of the Hebrew tongue.

For the Greek, the oldest grammar is that of Gaza; the
Latin ones are the works of Martianus Capella, Prifician,
and Alcofons Pedianus.

The modern grammars are: 1. For the Hebrew, that of
Pagninus, the edition of Hen. Stephens, or le Preux; at
Geneva, in 1502; that of Petrus Martinii at Roche
1502; that of Buxtorf; that of Ludovicus Deus, in three
languages; that of Sixtius Amama, which is a collection
from Martinius and Buxtorf; that of Bellarmine, with the
notes of Mus; that of F. Sghanther, of W. Schickard,
and of Vicht. Bythner, to the latter of which is annexed
a brief account of the Chaldees, useful for beginners; and
that of Gronovius, Schultens, Schroeder, Basly, Bennet,
Robertson, &c.; and for the Hebrew, without the Masorean
points, the excellent grammar of Meafel, to the second ed-
fition of which, publifhed at Paris in 1743, are annexed Chal-
dee, Syriac, and Samaritan grammars; that of Sharp,
Wilfon, Bines, Parkhurst, &c. 2. For the Chaldees, the bell are
those of Martinius, Buxtorf, and Lud. Deus, in three lan-
guages. 3. For the Syriac, those of Amira, Myricaus, Wa-
erus, and Beveridge; with the Chaldees and Syriac ones of
Buxtorf and Lud. Deus in three languages; and that of Lemb-
den. 4. For the Coptic, theProdromus Coptus, and Lingua
Egyptiaca Reclitus of Kircher. 5. For the Arabic, that of
Erpenius, and that of Golius, which is only Erpenius's a little
augmented. 6. For the Ethiopic, that of J. Ludolphus.
7. For the Perian, that of Lud. Deus, and that of J. William
Jones. 8. For the Saurit, those of Wilkins and Carey. 9. For the Armenian, those of Schroeder and Galanus. 10. For the Greek, those of Mart.
Ralandus Sylburgius, F. Moqueu, Vossius, Gara, Her-
man, Buufy, Port Royal, Manutius, Bell, Miller, Moor,
Parkhurst, Valpy, Jones, &c. 11. For the Latin, those of
Diodates, Defpauter, the Minerva of Sanctius, those of
Vossius, Ward, Clarke, and Sprat; that of Port Royal, which
is...
is only a collection from the rest; those of Lowe, of Eton, of Jones, &c. 12. For the Italian, those of Berger, Lanfran-cho, Port Royal, and Venerei Baretti, &c. 13. For the Spanish, those of Sahazar, Port Royal, the abbot de Vairc, &c. 14. For the Portuguese, that of Pereira. 15. For the French, those of the abbé Regnier, and F. Buffier, &c. 16. For the High Dutch, those of Chiaus, Hertbffgenius, Schottius, Boedichuer, and Steinbach. 17. For the German, that of Wendeborn, &c. 18. For the English, those of Wallis, Brightland, Greenwood, Lovth, Priestley, Murray, Cramby, &c.

**Grammar** is also used in the same sense with elements, as geographical grammar.

**Grammar, Philosophical,** is that which, without regarding the several idioms of particular languages, only respects those principles that are essential to them all. One of this kind was propounded by lord Bacon; not upon the analogy of words, but such as should diligently examine the analogy or relation between words and things. He approves too curios an enquiry about the original imposition and etymology of names. This he thinks an elegant, and, as it were, a waxen subject, that may be handomely wrought and twifled, 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, shou'd treat of their various properties, shewing wherein each of them excels and falls short; for thus languages might be enriched by mutual commerce, and one beautiful image of speech, or one grand model of language, for fully expressing the sense of mankind, be 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 respective languages. See Bacon's Doceine 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 statue may be divided into its several limbs; or else, as resolved into its matter and form, as the statue frame may be resolved into its marble and figure: and thus it is distinguished from the art of logic, which confiders speech as combined or compounded; so that by this synthesis, simple terms are combined to produce a truth, and two truths are combined to produce a third, &c. In this kind of grammar, the design is to point out the several powers and modes of expression which founds are capable of, to trace their connections with, or relation to the ideas they represent; and to shew 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 expression, 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 lefening the inconveniences arising from the superfluity. See Language. 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, 3d ed. 1765. See also Tooke's Diversions of Purley, and the preceding article Grammar.

**Grammar, Characters in.** See Character.

**Grammian, Grammaticus,** a person well versed in grammar; or who teaches grammar.

The denomination grammanian is, like that of critic, frequently, though unjustly, used as a term of reproach; a mere grammarian; a dry, plodding grammarian, &c. The grammian is conceived as a person wholly attentive to the minutiae of language; industriously employed about words and phrases; and incapable of perceiving the beauties, the delicacy, finesse, extent, &c. of a sentiment.

Scaliger, however, considered grammarians in another light. "Uti melum effe," says he, "bonus grammaticus? suinit enim ei, qui omnes auctores probe vult intelligere, elici grammaticum."

The title grammian, it is certain, was anciently a title of honour; 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 by Ger. Vossius, in his book of grammar.

The word was properly a title of literature and erudition, and was frequently given to persons who excelled in all, or many arts, called also polyhyletes.

Thus, Philoponus, a famous philosopher in Julian's time, remarkable for the extent and variety of his knowledge, was surnamed 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'Avery, a celebrated Neapolitan lawyer, was surnamed the Gramman.

The title grammian was anciently bestowed on those we now call 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 best Latin authors; "Of the celebrated Grammarians," and that Cornelius Nepos calls the commentators on the orators and poets, grammarians; and lastly, 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, Athenaeus, Julius Pollux, Macrobius, and Iulius Gallus: the works of these last authors are an affumblage 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 honour, it is through the fault of those who have assumed it; by their treating of grammar in a low, pedantic, dogmatic manner; reducing it to words and syllables; and dwelling altogether on trifling puerile remarks and confusions; whereas its ancient office was to make an accurate and thorough examen of an author; to enter into all his views; to point out the beauties, and the defects thereof; to distinguish the true beauties from the false; and the genuine productions of an author; from the supposititious; that is, a grammarian was then, what we call a critic now.

Those who only taught to read, understand, and explain authors, were called grammaticists, grammaticite; in contradistinction from grammatici; though, in course of time, the grammatici have risen in the place of grammatici, who are now preferred to that of critic.

**GRAMMATICAL, something relating to grammar.**

We say, grammatical construction; grammatical signification, &c. Idioms, as Angloisins, Latinisms, Grecoisins, Gallicisms, &c. deviate from grammatical strictness. 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, = 18.8427 French grains = 15.444 English grains = .0022653 English avoirdupois pounds.

This weight is the standard, or unit, of the new system of weights; 10, 100, 1000, and 10,000 times its weight, being expressed by the prefixes, deci, hæct, kilo, and myrio, respectively.
respectively; and 1, 2, 3, 4, 5, 6, 7, by the prelates de, coni, mili. Thus, hectogramme signifies 100 grammes, and centigramme signifies the 100th part of a gramme.

GRAMMELOUC, in Natural History, the name of an Exit 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 color of a hazel-nut, but something longer; on opening this there appear three cells, in each of which is contained one fruit, resembling the feel of the palm Chirith, 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 stool and vomit, and that often, so as to endanger the life of the person who has taken it. They alloy its operation by eating betel. Mem. Acad. Par. 1609.

GRAMMICA, in Botany, from γραμμα, linear, alluding to its slender thread-like form. Tourneir, Cochinch. 1701, appears evidently by its description to be a species of Cefolia, or Dodder. See Cuscuta chinensis, n. 6, which is probably the very plant.


Eff. Ch. Cephalus in straight felted lines. Cover none.

This genus differs from Polypodium, in having its capsules disposed in straight continued lines, instead of round dots. The involucrum is wanting in both. Dr. Swartz defines twelve different species. Of these three have a simple undivided frond, like G. lineolata. Swartz. t. t. f. 4, form the most natural assemblage. The genus has, however, the advantage of admitting some forms, which preceding writers did not well know how to dispose of, as G. Ceterach, (Aphylum Ceterach; lii. Sp. Fil. 1508; Scolopendrium Ceterach; Sm. Fil. Brit. 1134; Eng. Bot. t. 124.) and G. leptophylla, Swartz. t. t. f. 6, which Linnaeus and other botanists had hesitated whether to reckon a Polypodium or an Aphylum.

Dr. Swartz mentions two doubtful species; the Polypodium grammianum of Lamarck; perhaps his own Grammitis lineolata, and the Aphylum fimbriatum of Cavanilles lectures, n. 637, a native of the Philippine islands.

GRAMMONT, in Geography, a town of France, in the department of the Scheldt, and chief place of a canton, in the district of Audenarde, built at the foot of a mountain by the Goths, and thence called "Gottehern." When Balbino de Mons, count of Flanders and Hainaut, purchased the lordship of one Gerard, in 1668, 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 Dendre, which runs through it, divides it into the Higher and Lower Town; 20 miles W. of Brusselles. The place contains 5048, and the canton 163,000 inhabitants, on a territory of 921 square kilometres, in 17 communes.

GRAMMUM, a town of Hindoostan, in Mylur; 44 miles N. of Seringapatam.

GRAMPION HILLS, a range of mountains, extending from E. to W. through almost the whole breadth of the kingdom, from Lech Lomond to Stonehaven, and deriving their name from one of them, the "Mons Grampian" of Tacitus, where Calgacus 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 Saddle-bills on the E., the Ochills in the middle, and Camps-bills on the W. To the Grampian chain belong Ben Lomond, 3560 feet high; Ben Ledi, 3069; Ben More, 3093; Ben Lawers, the chief summit, 4215; Schiehallien, 3564; Ben Vorlich, 3550; and other 153 formidable elevations on the E.

GRAMPUND, a small borough and market town, in the hundred of Powder, and county of Cornwall, England, is situated on the banks of the river Fal or Falce, in the parish of Creed and St. Probus, the eastern part of the borough being in the former parish, and the western in the latter. Grampound is supplied, by Boarle, to stand on the site of the Volha of Probint. Exclusive privileges were conferred on this town by king Edward I., particularly a freedom from toll throughout Cornwall; and the remains of a Castle, or Fenol Wood, 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 Etham, 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 539, the houses to 80. Polwhele's History, &c. of Cornwall.

BEAUTIES OF ENGLAND AND WALES, vol. ii.

GRANPIUS, in Ichthyology, the Delphinus aera of Linnaeus; which the.

GRAMZOW, in Geography, a town of Brandenburg, in the Ucker Mark; 8 miles S.E. of Frengow.

GRAN, or ZESTERBURG, or Strigeida, a town of Hungary, situated near the confluence of the rivers Gran and Danube; the see of an archbishop; 55 miles S.E. of Prziborgh. N. lat. 47 44'. E. long. 18'.

GRAN, a small island on the W. side of the gulf of Bothnia. N. lat. 62° 1'. E. long. 17 22'.

GRAN, a sea-port of Spain, in Catane; 2 miles W. of Ferrol. N. lat. 43° 29'. W. long. 8 15'.

GRANA FIGLIA, in the Materia Medica, the fruit of a species of ricinus.

GRANADIS, or Greater Cardamum, are the seeds of the amomum of Linnaeus.

GRAN AROMA, the seeds of the common ricinus, called by some palma Chirith.

GRANADA, or GRENA, 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 Gibraltar, 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 56 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 S. and N. E., it is bounded by the kingdom of Murcia; to the S. and E. by the Mediterranean; to the W., by the kingdom of Seville; to the W. and N.W. By that of Cordova; and
and to the N.W. and N., by that of Jac. It lies between 36° 20' and 38° N. lat. and between 5° 5' and 3° W. long.; and contains about 661,000 inhabitants. This province has three sea-ports 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, now 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, Huelva, Antequera, and Alhama. Its rivers are the Verde, Xeril, Las Feguas, Guadalcena, Guadacena, Guadameje, Rio de Almeria, Rio Frio, Guadalmerena, Darro, Andacayo, Guadix, Bravata, Marchan, Alhuncara, Agus, Culebras, and Guadalete. This province is very mountainous; its chief mountains being the following, viz. the Sierra Vermella or Vermeja, i.e. red mountain, so called from the colour of the soil, the Sierra de Filabre, the Sierra de Bujo, the Sierra Blancailla, 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 Alpujarra, likewise in this province, is formed by the contiguity of several lofty mountains, and generally called the Alpujarras. 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 Andalucia, was first known to the Phcenicians 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 Abd-al-rahman, or Abderame, a prince of the blood-royal of the Omnipades or Almohades, feized on the throne of Spain in 755. In the year 1027 the empire of the Moors in Spain was difmemhered; and in 1221 the kingdom of Granada was difolved. Soon after this period, viz, in 1236, Mahommed Alamir, or Alhamar, founded anew the kingdom of Granada; and his descendants preferred for about 25 centuries the throne, which he transmitted to them. It was revered 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 15th 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 32 broad; it contained, as it is said, 32 great towns, 97 smaller ones, upwards of 2000 boroughs and villages, and 5,000,000 inhabitants. The revenue derived from it amounted annually to 700,000 ducats; and gold and silver abounded more in this kingdom than in any other country of Europe. But the flourishing fertility and wealth of this country palled 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 resource 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 200,000 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 heads 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 successive and varied amphitheatres of hills agreeably planted with vines, olives, mulberry, lemon, and orange trees, &c.; it is watered by five rivers, interfected 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, Alhambra, Albayzín, and Antequera. 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 valleys between the two mountains; it is embellished with a number of fountains, large gardens, handomest fquares, 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 Alhambra, properly speaking, is only a great fortress, situated on a mountain, called Sierra del Sol, or mountain of the sun; it was the residence of the kings whole palace still possesses great beauty. (See the description of it under ALHAMBRA.) The quarter of Albayzín 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 rampant. It contains about 400 houses. Antequera has the appearance of another faubourg built upon the plain; it was peopled by settlers from, Antequera, and is at present chiefly inhabited by dyers and flax weavers. Among the numerous fquares of Granada we may especially 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 Bivarambla, embellished by a beautiful Jasper fountain, and by the two fine edifices of the Alcaceria, which was used by the Moors.
Granada.

Moors as a bazar, and all 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 handsome dome, resting on twelve arches, supported by as 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 Charteux is covered with fine paintings in fresco, by Antonio Palomino. 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 25,000l. 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 councilors, two solicitors, and one alcalde mayor. The intendant of the province resides here; and the town has a criminal judge, two alcaides mayors for the administration of justice, a municipality composed of a certain number of regidors, 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 bastio. seats, 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, to 52,325 souls; although, upon good authority, it is said, they may be reckoned 80,000. Under the Moors, Granada carried on a great trade, and was famous for its own productions; it manufactured clothes, various kinds of woolen stuffs, and a great quantity of silks. Indeed, it is not possible to think of manufactures in Granada, without calling to mind the expulsion of the Moors, and passing 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 Townsend, ibid supra,) that of 100,000, condemned by the inquisition for apostatizing from the Christian faith, 4800 had been burnt without any good effect. Philip III., in the year 1609, banished to Africa 140,000 out of the kingdom of Valencia; and in the three years following, 200,000 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 state 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 best 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 manufacture of silk, of paper, and of gun-powder, 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 Andalusia, 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 1570 to 652, it was almost without number of inhabitants, and various oppressive restrictions and burdens; 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 stuffs are made; but they have not been very prosperous. Here is a manufacture of gun-powder 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 3000 quintals annually. In the vicinity of Granada are some considerable plantations of the sugar-cane.

The environs of Granada are delightful; the public walks, of which the most frequented are those on the banks of the Xirol 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 wildness of fruit trees, and yet are covered with the most luxuriant crops of all kinds of vegetables. Every cottage has a little court, or bowery, 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 fine stones of grain and beauty; and it has also a variety of alabasters, jaspers, 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. It has considerable commerce in indigo, cochineal, hides, and sugar. In the year 1680, this town, and also Leon, the capital of the province, were pillaged by the buccaneers of America. N. lat 11° 14', W. long. 86° 15'.

Granada, Neva, a vicerealty of the dominions of Spain, in South America, extending from the river Tumbes to the Caribbean sea; that is, from S. lat. 3° 50', to N. lat. 12°, or about 950 geographical miles; its medil breadth may be stated at 4° or 240 geographical miles. This grand and populous vicerealty, though it dates its origin from the year 1718, was, after a long suppression, only establishd finally in 1740. It is sometimes called from its capital Santa Fe, and comprehends the following provinces: 1st. Jaen de Bacearnos, La, Cuenca, Macas, Rio-bamba, Guayaquil, Quito, Tacames, Paños, Barbacoas, Popayan, Rapalo, Nivola, Antioquia, Santa Fe, San Juan de los Llanos, Merida, Santa Marta, Cartagena, Zinu, Choco, and the Tierra Firme, including the three districts of Darien, Panama or Tierra Firme proper, and Veragua. The ample provinces which form this vicerealty were mostly discovered and annexed to the dominions of Spain about the year 1536, by Sebastian de Benalazar, and Gonzalo Nicolas de Quesada, two of the bravest officers employed
in the conquest of America. The former, who command-
ed 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 Mexican and Peruvians,
they defended themselves with great resolution and good con-
duct. 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 1718 this arrangement was changed,
and the viceroyalty was established; but it was suppressed in
1724, and finally established in 1742. When the conquer-
ors first took possession of this country, it was more pop-
ulous 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 resembles 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, compris-
ised in the royal audience, are Carthagena, Panama, Santa
Marta, Maracaibo, and Porto Bello, with the dis-

dtrict of the river Orinoco; in the interior are Antioquia,
Choco, Veragua, Mariquita, Giron, Neiva, and the Llanos.
There is also a royal audience at Quito, and a governor and
president, who rules the lower provinces in subordination
to the viceroy of New Granada. But Quito remains a
bishops' see while Santa Fé is an archbishopric, founded in
1562, with Popayan and Carthagena as suffragans. In
1783 the archbishop was named viceroy. There are also
several missions in the country called Los Llanos, and on
the Apari, Meta, and Cañarami, with some little villages or
flotillas. There are on the Upper and Lower Orinoco, and
river Negro, assigned to the Capuchins in 1769, belong to
the government of Caracas.

The population of this vicerealty has not been accurately
determined; but if the general population of Caracas
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
college 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 incomparable; nor would it be easy in these distant pro-
vinces to collect an effective force of five or six thousand
men. The capital of this vicerealty is Bogota, or Santa
Fé de Bogotá, 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 vicerealty
has very much suffered by the suppre
sion of the galleons;
and though it has been encouraged by the freedom granted
in 1778, it is not yet recovered. The contraband trade,
carried on by the English on the Muíquito shore, and from
the Portugueze settlements in Brazil, and the Caribbean sea,
has impeded the exertions of the Spanish colonists. Its com-
merce is allowed to be very disproportionate to the distin-
guishing 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, Velez, and other towns and
villages towards the plains; and they consist of cotton cloths,
carpets, counterpanes, and woolens of various descriptions,
that support internal trade. The northern provinces pro-
duce excellent wood for the construction of ships; and the
dying woods are superior to those of Campeche. The
mahogany of Panama is exquisitely beautiful, and superior
to all others. The chocolate from the banks of the Magda-
lena is esteemed equal to that of Caracas; and vast harvests
of cotton and tobacco might be gathered, while the navig-
able rivers Magdalena and Ataro, and the ports of Cartha-
genca and Santa Marta, offer easy and commodious outlets
to the European markets. Its intermediate mart of Ha-
vana presents another convenience to the traffic of this
vicerealty. The culture of coffee and chocolate is in a
prosperous state in the province of Guayaquil. The falafel
and useful vegetable productions of these extensive pro-
vinces are so numerous and diversified, that industry alone
is wanting to open all the sources of commerce.

The climate of this extensive vicerealty 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 enwrons 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
duca sife and terminate 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 hordes and
mules which they sell to Peru. The mineralogy of New
Granada cannot be reckoned unimportant; Alcedo, cited
by Pinkerton, observes, that gold is here more abundant
than in any other part of America. The richest provinces
are in this respect those of Choco and Antioquia; and they
are easily accessible by the rivers Atrato and Guacualia,
which enter the gulf of Darien, and are navigable for a con-
siderable extent. Silver is also remarkably pure; and the
mines of Margaritones, in the district of Pamplona are so
rich, that if they had a sufficient number of labourers, they
might rival the gold of Potosí, 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. Plutina has been
thought to be the peculiar product of Choco. Salt is ob-
tained in great abundance. The natives use maize, or the
Caña 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 sash. They adorn their heads
with filings of painted flowers very ingeniously made of
vol. iii.

GRANADIER, Grenadier, or Grenadier, a foot-
soldier, who is armed with a firelock, bayonet, and in some
services a hanger, and a cartridge-box that will hold 56
rounds. They wear a high cap, fronted with a piece of
brafs, on which the king's arms is generally represented,
&c. and a piece of cloth upon their shoulders, called a wing.
In some armies they have better pay than a common
soldier. They were first established in France in 1607,
and soon after formed into companies; they were first
known in England in 1685.

GRANADIERS, or Grenadiers, Heros, called by the French
granadiers volans, or flying granadiers, are such as are
mounted on horseback, but fight on foot and on horseback.
These were first established in France by Lewis XIV. in
1676, and formed into squadrons.

Every battalion of foot has generally a company of gra-

nadiers belonging to it; which generally take the right of
the battalion; and, being the tallest and finest men,
frequently are the first in attacks.
We have found in England two troops of horse granadier 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. *Granados,* used in the Weil Indies, and retained by Tournfort and Adanson, for the *Papaffora* of Limneus. This appellation is particularly applied to the fruit of *Papaffora quadrangulatin*, much esteemed by Weil Indians, and sometimes ripened in England.

**GRANADO, GRANADA,** or *Granado,* in the Military Art, a hollow ball or shell, of iron, brass, or even guns, or potter's earth, filled with gunpowder, and fitted with a fusee 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 *fiest.* The latter to be cast with the hand, and hence denominated *hand-granados.*

The best way, Caimin observes, to secure a man's self 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, paffleboard, or other matter, filled with strong powder, lighted with a fusee, and thus thrown by hand into places where men stand thick; and particularly into trenches and lodgments. These are now funk into diffu.

Their composition is the same with that of *bombs*; which fee. For fire, they are usually between two and three inches in diameter, about the bigness of a common iron bullet, and weigh about three pounds; as to dimensions, they are commonly in thickness one-eighth, one-ninth, or one-tenth of their diameter; their aperture, or orifice, about 1½ times, as preferred by Caimin.

Thanus observes, that the first time granados were used, was at the siege of Wachtendonck, a town near Gueldres; and that the inventor was an inhabitant of Venlo; 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.

Granados were known long before the invention of granados. The ancients had a fort of olie, or fire-pots, somewhat of the same nature with our granados, but they were much less perfect.

Caimin mentions a sort 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 post town of Ireland, in the county of Longford. .

Joining is a remarkable hill or mount called the Mount of Granard, thought to be artificial, and the site of a Danish fort, which commands from its summit a most extensive prospect into six 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 deficient into them being jut 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 these the great men of the country preserve their corn; they first cover over the floor with straw, then they lay on the corn, full, as the heap rises, placing a thin bed of straw between the corn and the sides, 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 hought of trees, interwoven one with another. This they cover with about two feet thickness of sand, and over this raises a pile of earth, well beaten together, in order to throw off the rain both ways, that no water may settle on the place and soak into the magazine. The corn thus stored up keeps three, four, or more years very well; and not unfrequently, the proprietor being taken off by the severity of the winter, 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 store-rooms; for, if people descend into them before they have had sufficient communication with the fresh air, they are often killed by the damp; this, however, is easily guarded against. By these, and numerous other instances of the practice of other countries, it appears evident that fenneraneous 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 eggs 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 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 destruction of the other. These are the principal rules to prevent the corrupting of corn: but when the unchief is once began, 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 in the erecting of granaries, are to make them sufficiently strong, and to give them such a situation as may expose 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 strength, situation, &c. which ought to be observed in building an extensive granary, where large quantities of grain are sometimes deposited. 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.
duced annually on the farm. Where the practice of hoarding 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 this: 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 screening. This form 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 screened over. After about five or six months, it is raised to five or six feet thickens in the heaps, and then turned once or twice in a month. and screened now and then. When it has lain two years, or more, it is only turned once in two months, and screened once a quarter; but how long forever it is kept, the oftener the turning and screening are repeated, the better the grain will be found to keep.

It is proper to leave an area of a 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.

In Kent 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 screens 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 affected, 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 superficial 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 loading. The Russians prefer their corn in subterranean granaries, of the figure of a sugar-loaf, wide below and narrow at top: the sides are well plastered, and the top covered with flues. 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 Hanel and Dr. Hales, for ventilating or blowing fresh air through corn laid up in granaries or ships, in order to procure 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 basket-work of wire, is laid beneath 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 edgeways, and sloping 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 moist exhalations 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 fumigated 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 branching trunks on each floor, by means of which the air may be made to pass into a large trunk along the adjoining roofs walls: from these trunks several lesser 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: seams of one-eighth or one-twelfth of an inch are however to be left open at the four jamings of the boards, where they are nailed together, that the air may pass through them into the corn. In some of these lesser trunks there may be sliding shutters, in order to fly the passage of the air through these 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 damper of the external air from entering: to prevent this more folly, 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 fladdles, so as to have their lower floor at some distance from the ground, the ventilators may be fixed under the lower floor, between the fladdles, so as to be worked by men fladdling 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 outwards, but outwards, of the granary, so that, as it falls back, it may be worked to add to 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 bottoms.
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, suppose 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 stairs, or rather ladder, to go to the several cells, must be fixed on the outside of the building sideways, 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 interfaces filled up with brick. The floors, beams, and joists, are to be made strong to bear the weight of the corn; and the middle of the cells well lined with dry oak-board, clove jointed, and the outside weather-boarded, the boards being strongly nailed to the timber-work of the frame, and afterwards paved over with pitch.

The doors of the cells are to be so 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 lattice, 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 eieling. Over the upper room or cell is a loft, on the outside of the door of which is fixed a crane, to be worked within by a winch and driers.

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, stack, 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 sliding 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 is got in very dry. When it is to be hilled, 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 windows having all been open while the corn was falling from one cell to another, render 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, seeds of weeds, &c. that passes between the wires; and this screen is successively fixed under every aperture as the cells are successively emptied. After the first month, the corn need be hilled in this manner only once a fortnight, and after the first six months, only once a month, unless the weather should 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 fluided and ventilated, without the tedious mode of turning it with shovels, or other similar means.

However, the plan of a granary, taken from one built on his own estate, by a very respectable 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 hilled, and the air conveyed and circulated through every part of it, at whatever thickness or depth it lies, and one door only is necessary, however high the building may be.

There can be no doubt, that a granary of this nature may be very useful and convenient in many cases.

This sort 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 inside of the building: a, a, a, a, a, are wooden spouts, which reach from the air-holes on one side of the granary to those on the other. These spouts are formed of inch deal, about six inches broad, and made with an angle similar to those spouts that are employed to convey off the rain water from the eafings of houses. They are placed across the granary with the angle upwards, as represented at fig. 3: b, b, b, are the ends of similar spouts, which cross the others, and also reach between the air-holes on the other two sides of the building, as seen at fig. 4: c, c, c, are half spouts, extending in the same 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 square yards, and divided each way into three hoppers, 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 rest, and has a slider at g for opening occasionally, as may be necessary in taking out the grain. And there is another smaller hopper i, which is suspended to this by four iron bars.
GRA

helps $k$, $l$, $k$, that may be readily unfastened when required, from the square deal box $o$, fixed to the large hopper. Through the side of this box, the handle $b$ of the slider 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: $m$ is a small loft into which the faces of grain are hoisted, and emptied over the fides or rails of $m$, from which it falls down, and pales through the hopper $e$, till $f$ is filled (the slider $g$ 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 fpoints being all reversed, as noticed above, and open below, it is obvious that, although the granary be filled to the top, the corn will not, like a fluid, rise with the fpoints above the level of their lower edges; and thus there will be a vacuum left within every hopper, through which the air will freely pass. These fpoints 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 $e$, $e$, 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 $e$, fig. 5, should be the smallest, because there is the least obstruction there. The apertures $h$, $h$, $h$, ought to be somewhat larger, as the grain will meet with some little obstruction there; by the faces of the large hopper; and the apertures or openings $e$, $e$, $e$, should be the largest, as the obstruction in the angles will be greater than in any other part of the work.

GRANASOLA, in Geography, a town of Italy, in the department of the Amone; 6 miles N. of Faenza.

GRANATAN, a town of Saxony, in the circle of Erzgeburt; 12 miles N. E. of Freiberg.

GRANATUS, in Middle Age Writers, an officer in monasteries who took care of the provisions.

GRANATE, popularly called garnet, in Natural History. See Garnet.

GRANATE Polis. The counterfeit garnet in palette, is formed with three different proportions of the ingredients, which are these:

Take prepared crytal two ounces, common red-lend fix ounces, manganese fifteen grains, zaffer three grains; mix all well together, and put them into a crane: cover it with a lid, and let it in a potter's kiln for twenty-four hours.

Or, take crytal two ounces, minium five ounces and a half, manganese 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 crytal prepared two ounces, minium five ounces; mix them, and add manganese 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 soil of these makes a very handsome garnet of the common tinge; the second, a deep one, with something of the violet tinge, as many of the natural garnets have; but the third makes much the finest and brightest. Neri's Art of Glass, p. 134. See Glass and Paste.

GRANATINE, a name given by Kirwan to several triple compounds, professedly of the granitic kind; but as it includes also combinations that have no more than one essential 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 having all the characters of granite compounds.

GRANATITE. See Stauronite.

GRANATRISTUM, in Surgery, denotes a boil, or a carbuncle.

GRANATUM, in Botany, and the Materia Medica. See Punica.

GRANBY, in Geography, a township of America, in Essex county, Vermont, containing 69 inhabitants.—Also, a township in Hampden county, Massachusetts, E. of S. Hadley, about 98 miles W. of Bolton; incorporated in 1768, and containing 768 inhabitants.—Also, a township in Hartford county, Connecticut, on the line which separates Connecticut from Massachusetts; 18 miles N. of Hartford, and containing 2750 inhabitants.—Also, a small town on the Congaree, in South Carolina; a place of considerable commerce, having a curious bridge, the arches of which are supported by wooden pillars, fixed by iron-work, in the solid rock, 40 feet high above the level of the water, with the centre arch 40 feet in the clear, for admitting the passage of large trees brought down by the flood.

GRANBY Bay, a bay on the N. coast of the island of Dominica. N. lat. 15° 42'. W. long. 61° 25'.

GRANCEY-EN-MONTAGNE, a town of France, in the department of the Coté-d'Or, and chief place of a canton, in the district of Dijon; 21 miles S. E. of Châtillon-sur-Seine. The place contains 687, and the canton 4071 inhabitants, on a territory of 210 kilometres, in 11 communes.

GRAND, a term rather French than English, though used on many occasions in our language. It has the same import with great, being formed of the Latin grandis.

In this sense we say, the grand master of an order, the grand master of Malta, of the free-masons, &c.

So also, the grand signor, the grand vizier, &c. grandfather, grand-mother, &c.

In the French polity and customs there are divers officers thus denominated, which we frequently retain in English; as grand almoner, grand ecuyer, grand chambellan, grand voyer, &c.

GRAND, Anthony Le, in Biography, who flourished in the 17th century, was a native of Donay, and is denominated by some writers the ‘‘abreviator of Defeautre.’’ He was author of many works on the subject of philosophy, the chief of these are, ‘‘Institutiones Philosophiae secundum Principia Ren. Descartes.‘’ 4to. ‘‘Carolinus Nature Ars.’’

GRANOCLASTIC PERFORATOR.’’ Notes on the Physics of Rhault, which have gone through many editions; and ‘‘Histoire Sacre du Monde conditio ad Conscientiam magnum,’’ which is said to be his best performance. Moreri.

GRAND, Joachim Le, a French political and historical writer, was born in 1653 at Thorigny, in Normandy. In early life he entered into the congregation of the Oratory, which he quitted in 1676, and went to Paris, where he engaged in the education of two young men of rank, and at the same time applied himself with all diligence to the study of history under the direction of father Le Cointe. He first appeared as a writer in the year 1688, in ‘‘A History of the Divorce of Henry VIII. and Catherine of Arragon,’’ in three volumes. The main object of this work is to refute certain facts and arguments contained in the two first books of Burnett’s History of the Reformation. This produced a controversy between Le Grand and the English prelate, which has long since ceased to be interesting. In 1691 he addressed three letters to the bishop, on his critique of Boffliet’s History of the Variations of Protestants. After this Le Grand was taken from his literary pursuits by the appointment of secretary to the abbé d’Etrées, in his embassy to Portugal. In this situation he continued till the
the year 1697. The leisure which his diplomatic functions allowed was employed in translations of Voyages and Travels from the Portuguese. In 1752 he accompanied the same minister in Spain, where he remained about two years as secretary. Soon after this the marquis de Torei, 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 80 in the year 1733. He had been poffeced of church preference, and had held, for a time, the office of censer royal of books. Moreiri.

In Geography, is a denomination applied to a variety of places, as in the following instances.

**Grand Anse, or Anemie**, a well-built town in the western part of the island of Hispaniola; the road of which is so bad, that vefcils, in order to escape the wind, are compelled to take shelter behind Cape DomaMaria. 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-Bouy-Saliqua**, a town of France, in the department of the Creufe, and chief place of a canton, in the district of Grezot. The place contains 2525, and the canton 7820 inhabitants, on a territory of 215 kilometres, in eight communes.

**Grand Canal**, in Ireland, is the establishment of which we have given some account in our article CAMEAL, and have here to correct an error which crept into that account, in stating that the canal terminates in the Shannon at Tarmonbey, 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 Mountravan to Portarlington.

When the new part of the canal was finished in 1804, 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 surveyed 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 Doonore and Boulavoneen collieries 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 three feet four inches 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 Luc, Geology, p. 320.

**Grand-Champ**, a town of France, in the department of Morbihan; 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 202 kilometres, in four communes.

**Grand-Cormeau**, 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 12,795 inhabitants, on a territory of 1825 kilometres, in 13 communes.

**Grand-Fathers**, several large detached mountains of America, in the S.E. corner of Tennesse, in which are the head-waters of Tennesse Broad, and Catawba rivers.

**Grand Foro**, a town of Africa, on the Slave Coast.

**Grand-Island**, an island in the Atlantic, on the coast of Brazil; 15 miles long and two broad. S. lat 23° 15'.

**Grand 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.

**Grand 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 the Motte), and Alburgh.

**Grand Isles**, two large islands in lake Champlain, each about eight or ten miles long, and forming a townships 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 50th Geo. III. for the Grand Union canal provides, that a canal with locks is to be subsituted 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 Leicestershire and Northamptonshire Union canals further south than Market Harborough, where it now terminates, being dropt, in consequence of the adoption of the Grand Union canal above-mentioned, which will connect the above canal with the Grand Junction. The three aqueducts which the author of the One at Wolverton having been made flat elliptical, instead of the curves of equilibration, and the foundation also insufficient, they gave signs of great insecurity, especially on their centres being flumed, and in February 1828 two of them actually fell in and emptied the canal, as far as the flaps-gates; 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 substituting for these three arches, under the direction of Mr. Benjamin Bevan, who is now the engineer to the company. In 1807 a new reservoir 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 seasons.

In examining the strata and springs on the north side of the chalk furna', 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 chalk 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 tought or tunnel was begun in the upper bank of the canal near Wendover, and has been driven along the south side of the Tring summit, for supplying water to the locks below the side-ponds in dry seasons.
after the opening of the valve, in the beginning of summer, they pour forth a most surprising stream of water into the canal, which otherwise would have vented 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 beam-engine was erected near Nash-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 be quite balanced the advantages expected from this also; we are not 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 London by this canal, now pays a duty of 10s. 9½d. per ton (of 29½ x 11½ tons), which is equivalent to the duty on Newcastle coals in the Thames: in consequence of this heavy and oppressive duty, many wagons 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 Brunton tunnel. The design of a branch from near Tring, through Aylesbury and Thame, to the Thames and Isis navigation and Wilts and Berks canal near Abingdon, has been again revived, and it is 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 1806, 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 recovering 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 100½) were, in September 1810, reported to be currently sold at 302½ each; although, at one period, the same could with difficulty be disposed of at 65½ to 70½ 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 capitalising 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 Lake, a lake of Louisiana. N. lat. 32°. W. long. 93° 54’.—Alfo, 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 Lief, 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 2045, and the canton 10,493 inhabitants, on a territory of 227½ square miles, in 8 communals.

Grand Menen Island, an island of the Atlantic ocean; 6 miles S. by S.E. of Campo Bello island, opposite to Papamawooddy 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 lymph of valleys, which the great Creator has spread over the whole face of the earth, leaving no part, perhaps, originally of the surface, without a defient and out-fall to the sea; that the ridges, or summit-lines, form a lymph 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, showing all the connections and windings of these ridges in England, or even any local district, until of late, that Mr. Farcey has prepared a series of maps, 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-western,) proceeds to Rundaway-hill, and crosses the deep cutting of the Kennet and Avon canal, near to Devizes, near East Lavington, Winterminster, Wincanton, Beaminster, 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 descended to no lower strata than the red ground or marle, of which we shall speak further presently.

The other, or south-easteren 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 Burghley, by Highmore Park (near which it probably occupies the highest stratum in the whole British series,) near to Alton and Haslemere, when it soon descends off the chalk into the great southern demesn, (see Philosophical Magazine, vol. xxxv. p. 152.), and pursues the under meantides, through the wealds of Suffix and Kent, by Alford, Leith-hill, Handcross, (on the London and Brighton roads, being there on the lowest stratum but one which appears in that road,) by Turners-hill, Nutley, Crawborough, Rotherfield, Wadhurst, Tenterden, Shadoxhurst, Lympne (near Hythe), where it again ascends the edge of the chalk, and proceeds on it by Paddockworth, Swinyfield, 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 Swindon, when it turns to the N.W., and descends to the marle, and other strata below the chalk, crossing the Woburn and flratram, not far from Wooton-Basset; 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, Broad-way-hill, Lemington-hill, Long-Compton-hill, and Epwell; soon after which, the grand ridge begins to leave the free-stone, and takes to the dark blue clays, &c. under it, except crossing some points of the stone, and traverses the Penny-Compton tunnel, on the Oxford canal; thence by Helidon, and near Daventry, it crosses the Brimlunt 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 passes Gibsopton; and not far from Lutterworth it crosses the Lias clays and lime-stone 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, where, having crossed another fault, and got again upon the red marle, it crosses the deep-cutting of the Warwick and Birmingham canal near Beddesley-Clinton, and of the Stratford canal, near Heckley; thence by Ashley-heath, and proceeds the Well-heath tunnel of the Worcetter and Birmingham canal, and the Lapsi tunnel of the Dudley canal; after which, the grand ridge crosses the bafaltic 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 crossing an erect and demudated patch of the yellow lime-stata, it crosses the deep-cuttings of the Old Birmingham canal, the Wyrley and Ellington canal, and of the Staffordshire and Worcestershire canal, all near Wolverhampton town; then by Taterhall, Wrottesley, Blinshill, Cowley, Wootton, (near Eccleshall, Broughton, Blinshill, Maer, Madeley-park, to Keele, (near Newcastle-under-lnder,) where it has again got upon coal-measures, by Bigugle-hill, and across the Harecastle tunnel, on the Trent and Mersey canal, by Golden-hill, Wickhinton rocks, and, crossing an immense fault, descends to the lime-stone shale, (see Mr. Farley's section in Plate II. vol. xxx. of the Philosophical Magazine,) on Biddulph Moor; thence passes the top of the Great Rudyard reservoir, to Gunn-hill, and crossing to High Rocks rocks, it there ascends the first grit; then crosses a small trough of the first coal-shale and second grit, and descends again to the first grit, or Ramshaw rocks, and still further, on the lime-stone shale, at the Royal Cottage, along which it proceeds to the N.W. side of Flann, and then ascends the first grit again, on South-Axedge-hill; it again descends to the shale lime-stone in crossing Middle and Great Axedge-hills; from whence it ascends across the first grit and first coal-shale, and ascends the second grit 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-stone shale, and follows it across the Mancheller and Buxton road; soon after, it ascends the first grit and first coal-shale, on Comb's moor, and again descends to the shale, pales in drainage, (at mile S.E. of Chapel-en-le-Frith,) when, turning easterly, it crosses the Great lime-stone fault, (N of Dove-holes,) and is found upon the third lime-stone, on which it crosses the quarries and rail-way of the Peak-Forester canal; soon after, it pales over the bulge-edge of the third coal-stone, and descends to the great fourth lime-stone in Peak-Forester, which is probably the blue-stone stratum, to which the great ridge pales in its route through England; this lime-rock having been eroded to be four miles at least of perpendicular thickness below the top of the chalk, from whence we commenced our description; much the greater part of this vast series of strata having in this route along the grand ridge been lost suddenly by perpendicular lifts of the strata or faults, which, in proceeding to this point by more favourable routes, might have been seen half-stone in succession. For about one and a half mile the ridge proceeds upon the fourth line, then again ascends a point of the third coal-stone and third line, to the village called Sparrow-pit, in the Manchecher and Castleton road, where it again crosses the great fault and descends to the lime-stone-shale on Rudheath-edge, whence it proceeds northward, and after crossing the Brindle-road from Hayfield to Edale-chapel, it proceeds the first grit on Edale rock, and proceeds across the moors on Kinder-scout hills; there it leaves at their N.W. corner, and crosses the moors on the shale, and the ancient Brindle-road called Doctor-Gate, from Glossop to Aippo-Dale; it then ascends the first grit again on shelf-stones, and follows the same to Wainstones and Baldwlow-stones, which seems to be the highest land in Derbyshire, it then pales N. E. By Round-hill, and ascends to the first coal-shale, crosses the Manchecher and Penistone-road at Lady-croft; where, turning N.W. it ascends the second grit rock, and proceeds by Dean and Bretland Edges, to cross the Glossop and Huddersfield road, on the bogs upon this rock on Helm moor; from hence the ridge, after some distance, again descends to the first coal-shale, the first grit, and to the lime-stone-shale, crossing the Stangate tunnel on the Huddersfield canal near Marfield; the ridge then proceeds across Black-dene-edge, and crosses the deep-cutting of the Rocheda canal, near the village of Hundersfield, (which has improperly been said in the population accounts of 1821, to be a town containing 16,671 persons!) the ridge then pales Helme on the Burbury and Heli-ax road, whence it proceeds, and near Coine comes again upon coal-measures, which are, however, left again at the great fault, in which part of the Foulridge 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 Barnoldswick, Weft Martin, near the Cold-Comitlers, E. of Settenberg lime-stone, over Pen- ingham-hill, Swans-fell, Nine-standard, Kelton-fell, Lime- foret, Scordal-head, Milliborn-fores, Aldilone-moor, Hartistone-croft, Holm-a-foret, Talkill, and crosses to the Roman or Picts wall on the E. side of Upper Denton, and soon after it enters Roxburgshire 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 colater. 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 dreams of water are undergoing in the bottoms of valleys, and avoiding those disputes respecting, and the delay of making and improving bridges, fords, navigations, &c. owing to the rivers being part in one county and part in another, and by which also many of the most considerable 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 ONT. — A river of Africa which runs into the Indian seas. S. lat. 2° S. 1°
- 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 runs into the Missouri, N. lat. 38° 56'. W. long. 93° 25'.—Also, a broad river of America, which discharges itself into Lake Michigan, N. lat. 43° 25'. W. long. 85° 35'.—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° 42'.—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 Bifagos isles, N. lat. 11°. W. long. 14° 30'.

Grand Senes, an Indian nation, inhabiting a territory of the Missouri, and able to furnish 800 warriors.

**Grand Surrey-Canal.** This canal is yet in the same state, nearly, as when our account of it in the article Canal was written, in 1805, except, that about two miles in length of it, at its N. E. end, has been brought into use, since the Croydon canal has been completed; and that the dock for ships, at its entrance from the Thames, was completed and opened in June 1807, and has answered so well to the proprietors, that in the last sessions of parliament, they made an unsuccessful attempt to obtain power for a further extension of them. In February, 1809, 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, confiding of huge rocks in lake Michigan.

**Grand Trunk Canal.** is a name commonly applied to the Trent and Mersey canal, which fee in our article Canal.

**Grand Union Canal.** In the seisons of parliament, 1810, (55 Geo. III.) an act passed for making the Grand Union canal, the general direction of which is about S.W. 231/4 miles, in the counties of Leicester 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 Leicester-shire, 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 Leicester, Nottingham, and Derby must do; it is intended also to supercede the necessity 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, Leicester, &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 Gumley, and terminates in the Grand Junction canal near Buckby-wharf, near the S. E. end of the Braunstone tunnel. From Gumley in 1/4 mile is a rise of 76 feet by 12 locks, and thence to Watford, 20 miles are level, then in 1/4 mile is a fall of 53 feet by eight locks, and thence to the Grand Junction canal about three miles are level; near Husband's Bosworth is a tunnel of about 1120 yards long, and near Crick another of about 900 yards long. Near Crick it is proposed to make a reservoir of 60 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 14 at bottom, and its depth of water five feet; the locks are 82 feet long and seven wide, calculated for 25 ton boats. This line was first surveyed by Mr. James Barnes in 1803, and by Mr. Benjamin Bevan in 1808 and 1809, and the latter is appointed engineer for the execution of the work.

**Grand Western Canal,** is so denominated in an act which passed in the year 1795, as mentioned in our article Canal, but under which no progress had then been made. In April 1810, it was reported, that a beginning had at length been made on the summit level, in Holcombe, Devon. A much larger canal, capable of conveying ships from the Bristol channel to the south coast, has been some time in agitation, for avoiding the very circuitous and tedious navigation round the Land's End; which, however desirable, is fearcely practicable, we incline to think, for want of water.

**Grand Affrks, in Law.** See Affrks.

**Grand Cape.** See Cape and Attachment.

**Grand Con tamier, le,** an ancient book of very great authority, which contains the duodec julmons of Normandy.

**Grand Days,** See Day, in Law.

**Grand Dilects, dictioria magna,** a writ of dillect, 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 cases: 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 Elirix, guard, jury, lucrery, prior, provost of France, ferryman.** See Elixir, Guard, &c.

**Grand Gulfo, in Painting.** See Gusto.

**Grande, in Geography,** a town of Norway, in the diocese of Drongheim; 21 miles N. W. of Drongheim.

**GRANDE** is understood 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 saying simply, be covered. Others are grandees by descent: made by the king's saying, 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, sect. 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 Frith of Forth. If the grand-gor was the pox, and this distemper came into Europe at the siege of Naples in 1492, it must have made a very
very quick progress to cause such an alarm at Edinburgh in 1497.

GRANDI Ercol, 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 gained 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 unfortunately the chapel was destroyed, that part of the picture which was preferred was placed in the palace Tamara. His peculiar fluidity of manner made him many enemies in Bologna. 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 end of the 17th, and the commencement of the 18th century, was born in 1671 at Cremona. He was disposed to a studious 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 relinquished his own Christian name, and received that of Guy. He became, in the early progress of his studies, distinguished for his proficiency 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 prejuidiced 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 countryman Wallis, and of other celebrated mathematicians, were his favourite companions, and the objects of his familiar intercourse. He published a treatise to reduce the problems of Viviani on the construction of arcs, which he dedicated to the grand duke Cosimo 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 Bernoulli. By his life of St. Peter Damiano, published in 1702, and his examination of the legends of St. Romuald, he gave offence to the bigots of his community, and was deposed from the dignity of abbot of St. Michael at Pisa; but the grand-duke had too liberal a mind to be offended; and to shew the estimation 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 revived some curious and difficult problems for the improvement of acoustics, which had been presented to the Royal Society in Dublin, and having accomplished his object, he transmitted the solutions, by means of the Privilen minifter at the court of Florence, to the Royal Society at London. The principal work of Le Grandi was "A Treatise on Series and Infiniteimals." He appeared likewise as the defender of Galileo's doctrine respecting 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 inherer. &c. He was appointed commissiioner from the grand-duke and the court of Rome jointly, to settle some differences between the inhabitants of Ferrara and Bologna, concerning the works necessary to preserve their territories from the ravages of inundation. For these and other important public services he was liberally rewarded by his employers. Revealing 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 discussion 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 Aristotle. The reminder 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 1741. Morti.

GRANIER, Urbain, was born in the bitter part of the 15th century. His father, a notary-royal at Sabis, gave him a good education, and introduced him while young among the Jesuits at Bourdeaux, to whose friendship he was recommended himself, as well by his natural genius and fine 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 Loudon, of which they were the patrons, and procured him a prebend in the church of the Holy Crois. 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 suits in the ecclesiastical court, and he raised a grift of foes by his reported successful gallantries with the ladies, to the great mortification of disappointed rivals, incensed fathers and husbands. Aleague was formed with a view of driving him entirely out of Loudon, a heavy charge of debauchery, irreligion, and impiety was laid against him, in the bishoing court of Poitiers, who published a complete list of the priest's functions; and afterwards he was condemned to resign his benefices, and to the practice of penance and mortification. From a sentence to seve, 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 restitution of the profits of the benefices during his excommunication. The archbishop, a friend to peace, earnestly recommended him to change his residence, but he was incapable of renouncing his favourite passion revenge. He returned to Loudon, bearing in his hand a branch of laurel, and in his mind a fixed resolution of humbling his enemies. They were equally bitter, and marting 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 malignity. He trained up nuns in the Ursuline convent at Loudon, to act the part of women possessed with evil spirits; these were instructed to accuse, in their frantic fits, Grandier of having subjected them to diabolic influence. At first he was indifferent to the reports, considering the business as a mere farce. It had, however, a most tragic conclusion. Grandier, at length, finding, from the effects produced upon the credulous devotees, that matters were taking a serious turn, appealed to the magistrates, confessed of his own innocence, and requesting them to take cognizance of the affair. They
began the investigation, and were satisfied that the whole was the effect of trick, but when they attempted to interpope 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 denied their power. An application was made to the archbishop of Bourdeaux, who employed physicians to examine into the case, and by their reports no doubts were left in the mind of the prelate, that the bufnels was founded on the most gross and scandalous imposture. Upon this the archbishop issued an order, the severity of which put the whole legion of devils to flight. After a time the scheme was revived, 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 satire, entitled "The Shoemaker’s wife of Loudun," containing reflections on the cardinal’s birth and person, which had excited in the Loftom of the cardinal the sharpestlings of resentment. Believing that the information was correct, he determined to make the satirist feel the full weight of his vengeance. Grandier was arrested and brought to trial, and after a tedious process, in which the force 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 Aithatroth, a devil of the order of Seraphim, and the chief of the possesting demons, and upon the depo- sitions of the nuns, who pretended to be possessed of devils, the commissioners gave judgment, declaring Grandier duly attained and convicted of the crime of magic, forcery, and possestion, happening by his means in persons of the Order of nuns, &c. for the reparation of which he was condemned to an amende honorable, and to be burnt alive with the magical characters.” Grandier, innocent of the charge, heard the sentence without any emotion, and afterwards sustained the torture, ordinary and extraordinary with astonishing fortitude, never suffering one repining expression 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 show to what pitch of folly and madness the fury of an incensed cabal, the revenge of a minimiser, and the prostitution 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 1693, and which has been frequently reprinted. As an author Grandier is known by a funeral oration for Scavola de St. Martha, which is highly commended for the masterly frases of eloquence interpersed through it by Moret. 

GRANDES, 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 1769; 15 miles N.E. of Limoges.

GRANDOLA, a montain town of Portugal, in the province of Estremadura, containing 800 houses, situated between Cadiz and the sea-coast. Behind it is the Sierra de Grandola, that proceeds in two ranges, one behind the other, from east to west; the town is 27 miles S.E. of Setusia.

GRANDPRE, a town of France, in the department of the Ardennes, and chief place of a canton, in the district of Vouziers; 53 miles E. of Reims. The place contains 1350, and the canton 8617 inhabitants, on a territory of 2421 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 5389 inhabitants, on a territory of 2335 kilometres, in 7 communes.

GRAND-SERRE, La, a town of France, in the department of the Doubs, and chief place of a canton, in the district of Valentine. The place contains 1491, and the canton 6189 inhabitants, on a territory of 2523 kilometres, in 10 communes.

GRANDVILLE, or GRANVILLE, a town of France, in the department of the Channel, and chief place of a canton, in the district of Avranches; 12 miles N.W. of it. The place contains 5574, and the canton 12290 inhabitants, on a territory of 862 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 oyter-fishery, and on the land side quarries of large and very hard stones. N. lat. 48° 35’.

W. long. 1° 32’.

GRANDVILLIERS, a town of France, in the department of the Oise, and chief place of a canton, in the district of Beauvais; 14 miles N.N.W. of Beauvais. The place contains 1633, and the canton 12655 inhabitants, on a territory of 1679 kilometres, in 22 communes. N. lat. 49° 19’. E. long. 2° 42’.

GRANDWALDEN, or GRAN, a town of Norway, in the diocese of Chriftinian; 26 miles S. of Chriftinian. The town stands on an eminence in the midst of an extensive plain, looking down on several conical rocks, covered with trees, and remarkable for two churches in the fame church-yard, called the "Two Siflers."

GRANGE, an ancient term for a barn, or place where in to lay up and thresh corn.

The word is formed of the Latin grana; or of granum, grain, corn, &c. Hence also granier 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 familiar 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 flogging for horses, stalls for cattle, &c. and for an inn.

GRANGE, JOSEPH DE CHANCEL, de LA, in Biography, born in 1676 of an ancient French family, at Antoniat 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 father took him to Paris, and obtained for him the place of page to the princes 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 1718, and it charged the duke with the crime of poisoning several branches of the royal family.
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 of Antoinet in 1738. His works were collected in five vols. 1728.

At Linn., Gachon, ramulorum Rcccbr 3121. Clafs. This Peric. 427 to toothed Botany, 133 be 1. Ablinthium Tanacetum 88. Pluk. purple l2mo, ftigma the in 3. find which furgeon, late. 'ate both flpan 353. habit, lencLh, Cerinca Geography, "the 90. 2. dclerves in the vaders, the ties which florets, the in 3. N. odoratum martin, he alluded to these as much as Pl. G. dclerves in the place the superior, F. 19', finally Pic. G. of the following we had found it in t. 45 f. 3, which bears a rude resemblance to our specimen, in Parthenium Helipteropus. Finally, Burman's Sphenanthus africanus, Pl. Ind. t. 63 f. 2, which is not that of Linnaeus, and which Jullien suspects may be in Grangea, is not unlike this Hipsia. It be our plant, his suspicion is refuted The leaves in our specimen are occasionally undivided or lyrate, more cut than in Burman's plate, and less so than in Plukenet's t. 45 f. 3. The calyx, however, which is well expressed in the latter for the Parthenium, does not accord with ours.

2. G. minima. (Artemisia minima; Linn. Sp. Pl. 1192. Burm. Ind. 177. t. 58 f. 3.)—Leaves wedge-shaped, bluntly toothed, smooth. Flowers nearly febile.—Native of China, and the East Indies. We received it in 1803, from the source of the right honourable Charles Graville at Paddington, where it was preferred rather for its rarity and singularity than beauty. It is an annual plant, much smaller in all its parts than the foregoing, smooth, prostrate, of a light green colour. Flowers the size of a small pea, axillary, nearly febile, whitish, sometimes with a purple tinge. Their structure is extremely minute.

We scruple to admit Eubala decurcan as this genus, though somewhat similar in habit, because of its naked feet, and sharp calyx. See Eubala.

Grangemouth, in Geography, a village of Scotland, of considerable extent, founded by Sir Lawrence Dundas, upon the angle formed by the junction of the river Carron and the canal. It deserves mention as a place of considerable trade. Vessels bring into this port timber, hemp, flax, deals, and 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 London is carried on by the Carron shipping company; 3 miles E.N.E. of Falkirk.


1. G. isatisfolia.—A tree, native of the Isle de Bourbon, where
where it is called *Arbre de buis*, or Box tree, from the simi-
litude of its leaves to the Bayus. These are about an inch
large, ovate, acute, entire, veiny, smooth on both sides,
neally fellic by a pair of small awl-shaped *fipulae*. 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
Smalhand: 35 miles N.W. of Calmar.

**GRAN**, in our *Ancient Writers*, mutchfoes or whilters
of a beard.

The word seems formed from the ancient British or Irish,
*granum*, a beard.

It is given for a reason why the cup is refused to the
laity, "Qua barbati, & proxirios habent granos, dom puc-
num inter capulas fumant, prius liqueuros pilos infundit, quam
ori infundit."

**GRANIFEROUS**, producing or bearing any fort of
grain.

**GRANIFEROUS PDS.**, a term signifying such pods as con-
tain small seeds of some of the grain kinds.

**GRANILITE**, under this denomination Kirwan com-
prehends all varieties of granite that contain more than
three ingredients, such as quartz, feldspar, mica, and garnet:
such supernumerary ingredients, however, must be con-
sidered as accidental, and of too little importance to confer
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; 40 miles N. W. of Hernofand.

**GRANITE**, an aggregate rock, the essential ingredi-
ents 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 gra-
nular structure, while that of gneiss is generally flaty. (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 stone or the colour of a snorough's neck. The fact is,
that the word *granite*, which is now adopted by almost all
European nations, originated with Italian antiquaries, and
Tournafort 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
often of that than of any other colour. Sometimes the
feldspar is greyish and yellowish-white, and so like the ad-
mixed quartz, that it can be distinguished only by its pecu-
nlar fracture and lustre. It has been observed that the red
colour occurs more frequently in the newer, while the grey-
ish-white appears to be more characteristic of the older
formation of granite. Also long continued exposition of granite
to the action of the atmosphere contributes to render its feldspar pale or grey. Yellow and green feld-
spar seldom occur as ingredients of granite. The colour
of the quartz is usually greyish; sometimes this part is per-
fectly colourless and transparent, in which case, as the granite
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 une-
qually 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 some-
times 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 leaf. There are, indeed, some varieties of
granite in which the quartz or mica are entirely wanting.
Such binary aggregations of the granite kind have receiv-
ed distinct appellations by some authors. Those of quartz
and feldspar, or feldspar and mica, were called simply gran-
ites by Wallerius; semi-granites by Blumenbach; and
Kirwan proposes to denote all these duplicates in general by
the name *granite*, specifying, when necessary, the constituent
peculiar parts of each. The aggregate of quartz and mica is
called *gypfelslein*, or *feldlein*, 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 Finnish name of
*Rapakivi*. Such distinctions, however, are unnecessary and
inapplicable, since once in one and the same granite masts
the proportion and number of the component parts are seen
conspicuously to vary. Besides, there are many rocks enum-
rated by authors as granites, which cannot, with any pro-
piety, be referred to granitic compounds; such as feldspar
with hornblende, with nephritus fone, with garnet, fciatitic,
or the fane separately combined with quartz or mica.

There is but very little variety in the *form* of the com-
ponent parts: they are almost always massive and indetermi-
ately angular, and seldom occur in the form of regular
cryftals. The feldspar is found cryftallized in Bohemia,
at Schleckenwalde, near Carilib; at Tzeckler, in the
Saatt district; also near Holenuwald, in Upper Palatinate;
at Ochenschopf and Kelten, in the Fichtelgebirge; at
Schwierberg, in Saxony; in England: in the island of Arras,
&c. The granite in which these feldspar cryftals are seen,
is often of fuch fine grain, and the quartz and the mica are
often intimately united with each other, that they form, as it
were, a matrix for the cryftals; fuch granite is called *phry-
tite* granite. Part of the pavement on Weintiniller and
Blackfriars' bridge consists of this species of granite.
Something like cryftallization of the quartz is now and then
observed in granite, but it is always irregular. In the variety,
called graphic or Portoy granite, in which the feldspar
conflitutes by far the greateft part of the mafs, and which
contains mica in small groups, at great distances from
each other, the quartz is disposed in fuch a manner, that
when the rock is cut in a certain direction, it exhibits forms
which bear fome dilant resemblance to written characters;
whence it has obtained its name. But by fome, neither the
Portoy nor Siberian graphic fones are considered as true
granites. Alto, the mica is now and then found cryftallized
in granite, fuch as in Siberia, at Walheim. Metwois, Jor-
an-georgienfadt, in Bohemia, &c. In a variety of granite
of Mount St. Gotthard, all the three constituent parts are
dueil cryftallized together.

The feldspar is also sometimes found in the shape of
coneiform concretions, repreffing on their fracture a fur-
fce comparable to the paws of fome animals, or to the petal
of flowers; this fingular variety comes from the neighbour-
hood of Breitenbrunn, in the Upper Erstegebirge.

With regard to the *furfong* or state of preservation which
thefe three ingredients exhibit, we have to obferve that the
feldspar, which, in general, has a vitreous lufire and a perfec-
tly fellicted fracture, is also feen in various stages of decompo-
sition; it ocurs dull, earthy, fribile, and even entirely dif-
tegrated, in which state it is known by the name of porcelain-
earth. This difintegration takes place chiefly near the sur-
face
face of granitic mountains, and in the immediate vicinity of veins. Granite, with feldspar thus converted into an earthy flate, is found in Cornwall, on the Hartz, at Burkatdgrün in Saxony, &c.; and it is probable to Mr. Emmering that the giesf-stein, (Saxum fulciorum, Linn.) which, on account of its loose texture, is made use of in the brass foun-
deries of Sweden and France, may be granite in a similar flate of incipient decomposition. Also, the mica is subject to disintegration, especially when acted upon by subterrane-
ous water and vapours; the mafs into which it is thus con-
verted is considered as being of the nature of scinate. In this flate it is found at Fichtelberg, in the Upper Palatinate, and in the vicinity of Tonitz, near Carlbad, in Bohemia.

Bedeides feldspar, quartz, and mica, other fifts are found admixed, which, not being considered as essential, are generally distinguished by the appellation of accidental ingredients. They are, 1. Shorl; the most frequent of all. It occurs mafive and disseminated, sometimes also crystallized, and appears principally to belong to the old granitic formation; it is found in several parts of Saxony, in Lower Bavaria, Upper-
Palatinate, Wurttemberg, Transylvania, Cornwall, &c.; 2. Garnet: mostly in small grains. It occurs but rarely; but has been found near Leipzig (in boulders), at the Gren-
fenstein, and in the neighbourhood of Voigtdorf, in the vicin-
ity of Freiberg, in Saxony, in Lower Bavaria, &c. An aggregate of quartz, mica, and garnets, is by the Swedes called morka or morklen. 3. Thitons; frequent in the granite of Geier, Zimmwald, &c. 4. Neprhit or jade ap-
pears to occur not only in gneifs, but also with real granite, in Switzerland. 5. Rock crytal. 6. Beryl; in the island of Alba, and perhaps also in Sibera. 7. White common opal, sometimes occurs in the granite of Eiben flock in Saxony. 8. Topaze is sometimes seen, together with tin-
flone, in the granite of Zimmwald. 9. Caleareus fpar, very seldom. 10. Fluor-spar, the same; in Sibera, at Geier in Saxony. 11. Barytes, equally seldom; in Swit-
zerland.

Foreign beds are less frequently met with in granite than in other rocks. The more remarkable ones are those of tin-flone, galena, and blende at Zimmwald on the Bohemian frontiers; the beds of mica, particularly in Sibera and Lufatia; of quartz, and rock crytal in Switzerland. Also beds of feldspar are said to occur in it. The green feldspar, called Amazon flone, is found in large mafs in the granite of the Ural mountains of Sibera.

Stratification of Granite.—Though granite occurs frequent-
ly as widely-extended mafs, in which the eye is unable to discover any continued traces of parallel separation; yet there can be no longer any doubt that those geologists, who absolutely denied the existence 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 observed traces of demarcation to be anything but irregular and accidental rents and fissures. But even endeavours, by mathematical figures, to prove the impossibility of strati-
fication in granite. Notwithstanding all this, the ob-
servations of the most eminent geologists appear to prove that such stratification, even in the striéculus fons of the word, is not uncommon; but it is often a matter of great difficulty, for an eye, unacquainted with the structure of granite, to follow the obscurely marked lines of the flate of separation of the ftrata, especially when they are of consider-
able thickenes.

But in many cases, it would appear that this stratification is too distinct to leave any doubt upon the mind of the ob-
server. Nothing can be more convincing than the account

From Sauffure's observations, made on the several granite
typicales, or "agüilles" of the Mont-Blanc, it would appear that all the parts of this mountain are composed of

nullas followed vaff and continuous layers of granite through whole tracts of mountains in Sibera; indeed, part of the granitic Ural mountains, in the neighbourhood of the lake Kolywan, are described as having the appearance of huge artificial structures, in which the layers appear to be closely piled on one another.

Dr. Hutton supposed granite, when not philose in its
structure, to be altogether unstratified; professor Playfair, however, in his exposition of the Plutonic system, so far differs from the opinion of his ingenious friend, that he allows gra-
nite to form ftrata also where it has no character of gneifs; and he thinks that this admission does not embarrass the theory with any new difficulty; but, on the other hand, he sup-
pects that the stratification ascribed by the Neptunists to the granite mountains is, in many instances, either an illusion, or at least something very different from what, in other places, is accounted stratification. Professor Playfair found stratifica-
tion in granite, in England, at Churhby Forest, in Lancaster-
shire, where, particularly near Mount Sorrel, beds of granite are seen, holding the fame direction with those of the sub-
ject "horn-flone fchilus?" and likewise at Faffnet-water in Berwickshire, where the beds of granite run from about S S.W. to N.N.E. conformable to the fchilus on either side of them. Refpecting the granite mountains of Arran, we have it observed by the same philosopher that this stratifica-
tion appears doubtful. The mountains of Caithfield, in that interesting island, appeared, contrary to what Mr. Jameson had
advanced in his "Mineralogy of the Scottish Isles," without any vestige of stratification in its granite part, as did also the whole

GRANITE.
whole group of mountains to which it belongs; for though he few large tabular masses, sometimes nearly vertical, sepa-
rated by fissures, they appeared to him to be much too ir-
regular, too little extended in length and height, and null-
too much in thickness, to be reckoned the effects of stratifi-
cation. 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 such a
geognomon does not lay any stress upon his full remark on
the nature of the above-mentioned mountain.

The relative age of the different varieties of granite has
gained 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 gra-
nite, are too vague, or at least too little founded on actual
observation, 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 first or oldest is that which, of all rocks we are acquaint-
aced with, is the deep core of 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 eleva-
ted, is generally surrounded, and, as it were, enveloped by
other primitive rocks. It is frequently coarse-grained and
porphyritic. It occurs both stratified and unstratified; and it is
the latter which is often seen in large globular distinct concen-
trations 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 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 for-
mation. Such granite is marked with less 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 firm-
ness of the constituent parts. The third, or newest granite-
formation, is always found super-imposed on older primitive
rocks, often in an unconfomable and over-lying position;
and it also occurs in veins, which have been seen to inter-
fuse 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 co-
lor, and contains sometimes grains of garnet, and often
fragments of various primitive rocks of various magnitude.

When it occurs in veins, these are, according to the same
author, not connected with any rock beyond the strata which
they traverse. Examples of this newest formation are, that at
Greifenstein, a large group of deep rocks between Ehren-
friedsdorf and Geier in the Saxony metallicous mountains,
composed principally of feldspar and quartz, with but a
small portion of mica, occurs resting on mica slate, in an un-
confomable and over-lying position: it contains nivea of
quartz and feldspar, as also fragments of gneiss and mica
slate, 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 rockworks at Geyer, where it is contained in
a hollow of gneiss, and agrees in its character with that of
Greifenlein. Ano her portion of the same formation, is
that at Johanngeorginland, Auerberg, and Eisenflock,
where, however, it occurs only in veins, which are from a foot
to several fathoms wide, and are usually traversed by metalli-
ferous and other veins. Mr. Molls has given a very good
characteristic of this newer granite. Veins of the same kind
occurs also in Bohemia, Upper Lusatia, at Missella in the
Alps, in the Shetland islands, in Glen Moriston, and in the
Highlands.

The nature of the just mentioned granite veins is con-
fidered 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
masses 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 se-
veral examples of veins invisibly connected with larger masses;
in those at the site of Coll, in the Hebrides, at Portloy, 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,
traversing from the oldest granite into the adjacent rocks,
or of veins traversing newer primitive rocks, as it has
been insinuated 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 he subjoins the following remarks:

To which there is a most palpable difference between
furposing and genuine granite veins, the former being fre-
quently narrower than one inch, and commonly much raini,
and sometimes tortuous; but they constantly adhere moe firmly
to the adjacent stone, 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 always pretty straight, and
given off branches: they have a distinct separation, and
contain fragments of the adjacent rock, which lie promi-
cuously; the granite is constantly uniform, containing the
three ingredients equally mixed; and Dr. Mitchell has
always found it small-grained. The supposed granite, ac-


dding to him, consists of feldspar, of a very unequal grain,
including sometimes fragments of mica, and rarely flecks 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 de-
rable rocks we are acquainted with, it is, nevertheless, sub-
ject to disintegration, which manifests itself not only in the
crumbling of the surface of the exposed parts of granitic
beds, but likewise in the separation of vast masses, which,
being di united by the enlargement of the rents and fissures
that generally traverse the granitic mountains, or cross the
strata 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 Luc has seen on the Riecenbirsge, in Silezia, a num-
ber 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 gourds.

The Adon-flato mountains in Dauria, which consist of
granite, are, according to Pallas, in many parts broken into
all manner of shapes, representing vast runs, grottoes, and
immenf¢ flat masses piled on one another in all directions.

Several
G R A N I T E.

—Several of the mountains are, as it were, crowned 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 ridge the name of Adon-tholo, a Mongrool 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 Gochtfield and other mountains of Arran have the appearance of huge walls composed of large granite masses. At Huelgouet, in Lower Brittany, we are informed by Monnet, as also in the Volges, enormous masses of granite are seen piled one another, and forming many extraordinary groups. The granite being here divided into masses by fractures, which are filled up with granite pol
ing 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 granite rocks at Huelgouet, that appear to be in their natural position, and many of them form an assemblage of rock masses, which have a perfectly rhomboial form, and are regularly joined to each other by means of their corresponding planes. One of the inflected rocks in a group at Huelgouet, is called Pierre bradoule, 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 stones is not unknown in this country; the largest is that seen at the Land's End in Cornwall, where they are called Logan-ones; it weighs upwards of sixty tons, rolling on another rock of granite of considerable height close on the sea-shore. "The two stones," says Mr. Playfair, who avails himself of this phenomenon among others to explain the migration of flabby masses, "touch but in a small spot, their surfaces being considered 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 overact 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 vibrates backward and forward, till it is reduced to rest. Were it required to remove the stone from its place, it might be most 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 supped to perform, nature herself in time will probably effect. If the waife 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-one 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 M. Vatte framed his unfortunate hypothesis respecting the pyramids of Egypt, and the ruins of Persepolis, Paimyras, and Babylon, all which, together with the temple of Jupiter at Girgantum, the palaces of the Iacae 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 proportion, viz. gold, though very rarely, in Peru; native silver, almost equally seldom, at Wittenben and Alt Wolfisch, in the Black Forest, near veins of silver and cobalt; copper; galena, for instance, at Schielerhausen, at the foot of the Schieferkupp, in Silesia; blifmuth, zinc, cobalt, magnesio, molybdenum, arsenie, tungstene, and wolfram, all which occur generally in small veins; but tin, galena, and lead, are found in beds at Zinnwald in Saxony, and in Bohemia.

As to 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 Urshan and Altaic mountains, with the Caucasus; in Africa, the Atlas, several mountains of Egypt, those of the Cape of Good Hope; in North America, some 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 Parina, Sierra Nevada de Merida, &c.; in Europe, the Scœwogia mountains of Scandinavia, those of Finland, the Carpathies, the Hartz, the Riefengebirge, the mountains of Upper Lusatia, a part of the Saxon metalliferous mountains, (especially Eibenstock, Johanngeorgelstadt, Schwartzberg, Schneeberg, Ehrenfriederdorf, Geier, Naurndorf, 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 made of granite is manifold: it is employed for building, paving, slabs, for troughs in lamping mills, for millstones, &c.

The use of granite for architectural and economical purposes is perhaps no where more amply displayed than at Peterburg, 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 Crouflad; and both banks of the Fontanka and of the Catharine canal, are lined by high walls constructed of such slabs of granite; as are many bridges over the Neva, balustrades, &c. The pillars, flairs, balconies, &c. in the palace of Crouflad, are almost all of the finest kinds of granite. Those employed for ornamental architecture are cut and published by lapidaries; but those intended for less delicate purposes, such as common slabs, slaps, cylinders, troughs, &c. are worked by peasants, particularly by those of Olonek. The government towns, however, Moscow 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 fucs, 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 are not included, one of its ingredients being hornblende, which alligns it a place among the slates.

See Shelves.

Grey Granite of Clevs, in the department of the Rhine; it consists of white quartz and black mica, with large crystals of rose-coloured feldspar. The columns of the Eglise d'Encé
**Granite.**

d'Ené (ancient temple of Augustus) at Lyons, are of this kind of granite, which has also been worked by the Romans.

**Grey Granite of Thun.**—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. Perin, not far from Thun, is exactly like this, except that its feldspar crystals are of a rose-colour.

**Grey Granite of Lugozzi.**—Found in the small island Lugozzi, near Bonifacio, S. of Corica, in the straits 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 unfinished 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 Maιe Napoleon; they were taken out of the church which contained the tomb of Charlemagne, at Aix-la-Chapelle.

The grey granites are much more common than the green or grey, 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 Pamphilii, near Rome.

**Fine grained antique Granite.**—(Bafalte verd oriental.) The component parts of this work are so minute 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 Albanii. There is another variety with white spots, which is known at Rome under the name of Bafalte Orientale pitchidocho; 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 filentile.

**Granite of St. Chrisphb:**—composed of violet quartz, white feldspar, and green mica. This magnificent rock is found at Olfans, in the department of the Here.

**Corfican orbicular Granite.**—This beautiful rock (which probably belongs to the flinty formation) was discovered by M. Barral, in the island from which it derives its name. Its composition is very extraordinary; it has a ball 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 radiated appearance, rather 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 linear hornblende; and this is succeeded by a white, generally translucent quartz layer, of about four or five lines in thickness, inclusive of two or three very thin layers of hornblende, that are generally seen within the substance of this third principal layer. Each of these layers is generally of equal 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 gulfs of Valino, in Corsica: its weight was about 80 pounds; but it was soon broke into small fragments, which are now distributed among collectors. There is a beautiful vase of it, one foot six inches high, in the cabinet of M. Dedree. The granite of Corsica is figured by M. Faujas de St. Fond, in his "Elis τ Γeolοgmς," and in Mr. Sowerby's "Exotic Mineralogy."

Among the red granites, we have what is called red oriental granite, which, as usually containing hornblende, is often in large separate patches, will be described under *Serafini*.

**The red Granite of Innsbn.**—This granite, says M. Patria, is distinguished from others in this, that the feldspar, instead of being in grains, or paralleloided crystals, as in most other granites, constantly 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 reddish ground. The rocks, which serves as a pedestal of the equestrian statue of Peter the Great, at St. Petersburgh, 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 Petersburgh, its weight was calculated to 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 form ascribed by Patria to the feldspar.

The public summer promenade-garden at Petersburgh is decorated with a superb colonnade 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-Olrow, 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-Rome.

**Red Granite of the Voges Mountains.**—This granite is composed of large laminae of rove-coloured feldspar, grey grains of quartz, and small scales of mica. It has so strong a resemblance to the Egyptian red granite, that it is difficult to distinguish them. Its quarries are on the heights of Montagne, near the Pepean mountains, in the Voges.

**Veil Granite of Elbo.**—The feldspar of this variety is in large violaceous crystals. The pedestal of the equestrian statue, in the Piazza della Santissima Annunziata at Florence, is made of it, as are also the fudes in the chapel of St. Lawrence in the same town.

**Rose-coloured Granite of Brown.**—This beautiful granite consists of flesh-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 Milan, and the whole of the neighbouring country, with this granite. It takes a very fine polish: here and there 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, porticoes, &c. are seen of it at Milan.

The name of graphic granite is given to those kinds in which the feldspar forms large concretions, intermixed with grey quartz-crystals, exhibiting, when cut transversely, angular
G R A

gular figures, mostly shaped like a 7; while others are less regular, and bear a distant resemblance to rude alphabetical writing. They are not considered to be genuine granite by some mineralogists.

**Graphite Granites of Paros.**—The feldspar 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 Granites of Sibera.**—Its feldspar is of a yellowish-white, or reddish colour; the quartz, exhibiting figures similar to those of the quartz in the preceding fort, is of the variety called fumicky topaze. Mica occurs in it in small nets, and black hollow in acicular crystals.

**Graphite Granites of Autun.**—Of a pale fusc-colour; quartz-crystals grey, very numerous. It is found in the neighbourhood of Autun, department of Saône-et-Loire, particularly at Marmagne. Thus, in M. Brand's opinion, is the most beautiful of all graphite granites. Another variety of this stone is found at the same place: its feldspar is white; the quartz grey, in small crystals; it is susceptible of very fine polish.

**Graphite Granite of Conacien.**—Likewise of a rose-colour; but generally paler than that of Autun, from which it is also distinguishable, by its quartz-crystals being larger, and at greater distance from each other. It contains some thinly disseminated bronze-coloured mica. It takes a fine polish.

**GRANIVOROUS.** An epithet or denomination given to such 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 diggelling of dry and hard food.

**GRANNA,** in Geography, a town in Sweden, in the province of Småland; 18 miles N.N.E. of Jonköping.

**GRANO,** in Biography, a performer on the trumpet and German flutes, and a composer of tunes for those instruments, which had their day of favour in the early part of the last century. He was a kind of mongrel dilettante, who during many years condescended to make concerts and give lectures, on prophet of, always intimating that it was merely for the pleasure of amusing the public and instructing individuals. Gran's trumpet march was long used by the Guards.

**GRAN'SON,** in Geography, a small island on the W. side of the gulf of Bothnia. Lat. 61° 5'. Long. 17° 15'.

**GRANSEE,** a town of the Middle Mark of Brandenburg; 30 miles N.N.W. of Berlin. Lat. 52° 59'. Long. 13° 15'.

**GRANSO,** an island in the Baltic, near the E. coast of Sweden. Lat. 57° 46'. Long. 16° 54'.

**GRANSO,** a town of Switzerland, in a haillage of the same name, belonging to Bern and Friburg, situated between the lake of Neuchâtel and mountain Jur, 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 Neuchâtel. Lat. 46° 50'. Long. 6° 26'.

**GRANT.** CONCESSION, in Law, the regular method by the common law of transferring the property of incorporeal hereditaments, or such things of which no livery be had. (Co. Litt. 9.) For which reason all incorporeal hereditaments, as lands and houses, are said to be in livery; and the others, as adowments, commons, rents, reversion, &c. to lie in grant. (Ibid. 172.) The reason is thus given by Bracton (l. ii. c. 18): "traditione, or livery, nihil aliud est quam rei corporalis de persona in possessione, de manu in manum, translatio aut in possessionem induit; sed, rei incorporales, quod ipsum fuit rei vel corporis inherens, traditione non patitur."

These, 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 attornements 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 "facta et concessa;" "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 Records.) No freedman can be given to the king, nor derived from him, but by matter of record. To this end a variety of offices are erected, communicating in a regular subordination one with another, through which all the king's grants must pass, and be transcribed, and enrolled; and that the same may be narrowly inspected by his officers, who will inform him if any thing contained therein is improper, or unlawful to be granted. These grants, whether of lands, honours, liberties, franchises, or aught beside, 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 grantee," shall be taken more beneficently for the king, and against the party; whereas the grant of a suffect is confirmed most strongly against the grantor. It is therefore usual to infer the "in 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 suffect grant shall be confirmed to include many things, besides what are expressed, if necessary for the operation of the grant. Thus, in a private grant of the profits of land for one year, free rents, egress, and regresses, to cut and carry away those profits, are also inclusively granted. (Co. Litt. 56.) And if a feoffment of land was made by a lord to his villein, this operated as a manumission (Litt. 9, 206); for he was otherwise unable to hold it. But the king's grant shall not be extended to any other interest, than that which is expressly expressed in the grant. As, if he grants land to an alien, it operates nothing, for such grant shall not also extend to make him a tenant, that he may be capable of taking by grant. (Bro. Abr. tit. patent. 62. Finch. L. 116.) 3. When it appears, from the face of the grant, that the king is muliken, or deceived, either in matter of fact or matter of law, as in case of false suggestion, misinformation, or misfeasance 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 he grants an estate contrary to the rules of law; in any of these cases the grant is absolutely void. (Frem. 172. Finch. 101, 102.) To prevent deceits of the kind, with regard to the value of the estate granted, it is particularly provided by the Statute 1 Hen. IV. c. 6. that no grant of his shall be good, unless in the grantee's petition for the same mention be made of the real value of the lands. Blackst. Com. vol. ii.

**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 Kesteven 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 aisles, with three large semi-octagonal windows, and is celebrated for its lofty spire, which is 273 feet in height. The style of architecture appears to be that of the thirteenth century: though Mr. Cough observes that the church was endowed by Hugh, bishop of Lincoln, A.D.
Beneath the church is a chancel-house, filled with human skulls and other bones. Among several handsome monuments in this edifice, are, one to Sir Thomas Bury, chief baron of the 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 Winchelsea, 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 into the town, on St. Peter’s hill, formerly stood an elegant crofs, 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. Grantham 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 house is 651, 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.


Grantham Canal, is the parliamentary name of an inland navigation about 33 miles long, in the counties of Nottingham, Leicestershire, and Lincoln, of which we gave an account in our article Canal, and nothing material has occurred to be added thereto.

Grantham, a town of Scotland, in the county of Inverness; 17 miles S. of Forres.

Granville, George, baron Landford, 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 subject of this article, who is thereby separated from the rest of his house. He showed very early talents, and was entered, in his 12th 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 accession of James II. he offered incense to the new prince in three short pieces, of which Dr. Johnson says, “the firft is profane, and the two others such as a boy might be expected to produce.” In 1668, when an invasion was threatened, he was desirous of devoting his life to the service of James, and requested his father to recommend him to the king for that purpose. The revolution succeeded, and being possessed of 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 Gallant,” said by himself, by way of apology, to have been written at an age when some persons 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 personages in a translation of the Philippi of Demosthenes, to rout the nation to oppose the Philip of modern times. By the death of his elder brother Sir Beliv Granville, in 1766, 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 Landford, baron of Biddaford, at the memorable creation of twelve peers, in one day, Dec. 31, 1711. The elevation, however, of lord Landford 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 councilor, comptroller and treasurer of the household; but the accession 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, protesting 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 resumed 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 money, obliged him to spend three years on the continent. During his absence, the first volume of bishop Burnet’s “History of his own Times,” making its appearance, lord Landford undertook the vindication of the duke of Albermarle and the earl of Bath, from some aspersions 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 Clara-ndon, 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 to the change in the succession, which formerly he had regarded 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 63rd year. In private life, lord Landford 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 kindnes by his dedication of Windsfor
Foref. 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 ob-
ject of his youthful passion. These are not either highly
poetical nor strongly expressive of feeling. Johnson
characterizes his “Essay on unnatural Flights in Poetry,”
and poffeasing a didactic merit, and his “British Enchanters,”
like and pleasing. He seems to think favourably like
his epilogues and prologues. Buys Brit. Johnson’s
Lives of the Poets.

Granville, in Geography. See GRANVILLE.

Granville, a county of North Carolina, in Hillbo-
rough district, S. of Virginia, containing 14,015 inhabi-
tants, of whom 6106 are slaves. Its chief town is Williamburg.
—Also, 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. — Also, a town-
ship of Hampshire county, Massachusetts, about 14 miles
W. of Springfield; incorporated in 1754, and containing
2329 inhabitants. — Also, a poll-town in Washington county,
New York, containing 3175 inhabitants.

Granville, or Greenville, a flourishing town in Meck-
lenburg county, Kentucky.

Granville’s River, a river of the island of Eiggott,
or New Guernsey, which runs into the sea, S. lat. 10° 42'
E. long. 163° 58'.

GRANULATED OIL. See OIL.

GRANULATION, in Chemistry, an operation perfo-
med on metals, whereby they are reduced into small globules
or globules.

It is done by melting them, and when in fusion, cat-
ing them from a certain height into cold water; in which
they congeal into granules, as required, and are hereby rendered
more easy to be diffus’d. The best way is to pour the
fluid metal through a cullender, or a new birchen braun, or
to agitate the water with a broom, thus giving it a circular
motion while the metal is poured in. Copper is granulated
for making brass in a cylindrical wooden reever, four or
five feet deep, in which a circular brass or copper bottom
may be raised or lowered by means of a chain. The re-
ver is covered with a copper lid, in the middle of which is
a hole half a foot in diameter, intended to receive an iron lade
pierced with holes and coated with clay. The reever
being filled with water, the melted copper is poured through
the holes in the lade 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, Dicl. Chem. Eng. edit. art
Brass. See Brass.

Lead, tin, and brasses, which are very brittle, when they
are so hot as to be almost fused, may be granulated by pour-
ing them, in a state 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 longer become solid,
and consequently very brittle, than they are shivered, by
being dashed against the sides of the vessel 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. 70.

The term granulation is also applied to gum-powder, which
see.

The granulation of common towing hot 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 (littered in during the fusion), renders
it less fluid. An oblong shallow vessel of iron, perhaps 10
inches wide, 14 long, and 24 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 tube 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 cauldron; and a stratum of
soft drops or fillets, found on the surface of the fused
alloy, is then placed on its perforated bottom, and being
flungly pressed down with the ladle, forms a kind of filter,
which quickly chokes up the apertures, and prevents the
metal from flowing through them in considerable streams. The
fused metal is then poured by ladle-falls into this vessel, 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
by 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 40 to 100 feet. Besides, it is first dried
and sifted. It is then boarded, which consists in scattering it
on several polished planks, or trays of hard wood, with rings
in the form of a ni, except that the sides converge towards the
lower part, to which a flight inclination and alternate motion
in their own planes are given by boys employed in the manu-
facture. The shot, whole form is imperfect, are detected by
the sluggishness 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 exceed-
ing two spoonfuls to a ton, in an iron vessel, turning on an
horizontal axis, like a barrel churn. It does not appear that
any higher degree of perfection than that which is thus at-
tained remains to be desired. The argentine brilliancy of the
shot when newly made, the beautiful accuracy of its
form, and the curious influence of inanimate tactualities which
it presents when scattered on a plate, renders it even an
agreeable object of contemplation. Nicholson’s Journal,
vol. 1. 410.

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 vessels, into
which new substance the old vessels very probably extend,
at the same time that entirely new ones are generated in it.
Hence granulations are exceedingly vascular, perhaps more
so than almost any other animal substance. Mr. Hunter in-
forms us, that he noticed upon a fore a white substance, ex-
actly 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 vascular; for, on touch-
ing it with a probe, it bled 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 passed his probe into it, he did not feel the bone
bare; but only its resistance. He conceived this substance
was coagulating lymph, thrown out in consequence of in-
flammation,
GRANULATION.

flammation, 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 subsidence 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 fore 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 subsidence, the blood not having time to become dark.

When granulations are naturally of a livid red, they are commonly unhealthy, and flew a languid circulation. Such appearances may often be induced by position, and we frequently see it take place on fore 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 inflammation 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 use of which is to bring about the union of parts, somewhat like what is the result of union by the first intention. See WOUNDS.

The disposition which granulations have to unite with each other upon coming into contact, without the appearance of any intermediate animal subsidence, is perhaps effected, as Mr. Hunter conjectures, in the following manner. When two found 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 rationale of this minute process of nature; but the curious reader must refer 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 bone, 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 abcesses, not only does not readily granulate, but does not readily unite with the granulations underneath. Hence the frequent formation of fistula 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 fore 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 inflammation and probably ulceration; so as to form new granulations, and by this means give them a chance of falling into a sound flake.

It is also noticed by Mr. Hunter, that granulations are not furnished with so much power as parts poikils, which are originally formed. Hence they more readily ulcerate and slough. He states, that they not only flow 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 stated 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 short, when cicatrization can be accomplished; but while a fore is in a granulating state, they frequently perish without any visible cause. Thus, says Mr. Hunter, a person may have on his leg a fore, 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 cicatrization 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 cicatrization 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 subsidence, 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 looseness of the parts, on which they are formed. When new skin cannot be produced, the granulations do
do not so readily contract, 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 skin, &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 foro.

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 less subsistance in the surrounding parts.

The contraction of granulations may often be affiicted by art, namely, by using bandages, which tend to pull, draw, or keep the skin near to the foro which is healing.

Besides the contractile power of the granulations, there is a similar power in the surrounding edge of the cicatrizing skin, which afflicts 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 foro is high, grasping 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 pleats, while the new skin is smooth and shining. The original skin, having little or no power of contraction, is a reason why round pores cannot so readily heal as long ones.

Mr. Hunter has explained, that the axes, 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 fures which are healed, especially in found parts. When a thick thigh, seven or eight inches in diameter, has been amputated, the surface of the foro is of the same width; yet, in the end, the cicatris will be no broader than a crown-piece, in consequence of the old skin becoming drawn over the ulcer, by the contractile power of the granulations. The advantage of this is considerable, since such parts as are originally formed are always much lighter for the purposes of life than those which are newly formed.

After all, a fore is covered with skin, the subsistance, which is the remains of the granulations on which the new skin is formed, still continues to contract, till hardly any thing more is left than what the new skin is based upon. This is a very small part, in comparison with the first formed granulations, and, in time, it loses most of its apparent vellums, becoming white and ligneous. All new-healed fures 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 position 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.

GRANULAE, in Geology, is a term which Mr. Whiteburn, (‘Enquiry,’ 4th edit. p. 180) and others, employ to express the grains or minute lumps of floy substance, composing the sand or silt found on the surface of valleys, and which is formed by attrition and the grinding down of stones of different kinds.

GRANULOSE Roots, are those composed of smaller knobs than the graminose ones, and resembling so many grains of corn; of this sort is the white fassifrape.

GRANUM VARISC, in Botany, a name given by some authors to the turpentine-tree. The fruit of this tree is reddish white unripe; but as it ripens, it becomes of a deep blue-green colour, and hence the name.

GRANZA, in Geography, a town of Africa, in the country of Magheda.

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 coasts of Catalonia, Roussillon, Languedoc, as far as Marseilles; and on the other side, to Alican, Carthagena, 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 parts of Galicia. The largest of these ships are from 50 to 60 tons, each having a crew not exceeding 15 men. They carry out wines, silk, wool, dry fruits, and kals; and return with horses, woolens, hounnery, spices, and corn. Gras is pleasant in summer, on account of the sea-baths, which draw together a great number of people for health or amusement.

GRAPE, the fruit of the vine. See also Wine.

GRAPE HYACINTH. See Hyacinth.

GRAPE, MAGNOVE or sy-fide. See Coecophora.

GRAPE-Tree, See LIOSPERMUM.

GRAPE-GRASS, or NATURAL HISTORY, a name given by authors to a species of poacereances, 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 Gall.

GRAPE-LEAF, in Artillery, is a combination of small holes, 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 holes in grape varies according to the service or size of the gun; in sea-service nine is always the number; hut by land it is increased to any number or size, from an ounce and a quarter in 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.

GRAPE-BOAT, Botanize, is a fort of fladagmites, which effervescce with acids, according to Dr. Grew. “Varieties of Greschen College,” p. 324. It is also the name of certain botrodial flacettes, which are sometimes met with, pendant from the roofs of caverns in lime-cleve districts.

GRAPE, in the Mange, a term used to signify the arums or many tumours that happen in a horse’s leg. See Arum.
GRAPHICAL 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 squares, 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 included, pictures seen through it have a fine relievo, 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. xvi. p. 280, &c.

GRAPHIDA, in Natural History, a name by which some authors have called the morchelius, or French chalk.

GRAPHIS, in Botany, from γράφω, to write, a name invented by Adanson, who is pleased to spell it graffis, and adopted by Ehret, for the various species comprehended under the Lichen scriptus of Linnaeus, and which constitute the very distinct genus of Opegrapha in Acharus; see Eng. Bot. v. 25, 26. t. 1753, &c.

GRAPHISCUS, 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 Celsus.

GRAPHITE. See Plumbago.

GRAPHOIDES, γράφω διά, in Anatomy, an appendage of the bones of the temples, long, small, sharp, and a little crooked, like a cock's spur; called also flabodes.

The same name is sometimes also applied to the mufcus digitatus.

Likewise to 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 semicircle; which fee. Mr. Nichollson, in the fifth volume of his Journal, 8vo, has described, and illustrated by appropriate figures, a subterranean graphometer, invented by M. Komarzofski, F. R. S. and presented to the National Institute of France. It is a simple contrivance of the common theodolite (which fee), 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 same Journal, "we have the description of an instrument resembling a graphometer, invented by Cit. Carangeau, for determining the mutual inclination of the faces of a crystal, or its prominent angles; it consists of two concentric, equal quadrantal arcs joined by a hinge; to which are applied compass-legs or radii, capable of being shortened to apply to small crystals, &c. See Go- 
imeter. See also Plate VI. Crystallography, fig. 93.

GRAPNEL, or GRAPLING, on Shipboard, a kind of small anchor for boats or gallies to ride by. It differs from other anchors, as having four or five flukes and no finch, though there are some with three flukes, with which they use to sweep for hawlers or small cables. In men of war also, the grapnels, or at least a lighter kind of them, whole

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 boarding of her. They are particularly useful in fire-ships, and called fire-grapplings.

GRAPPLE, in the Meneage. A horse is said to grapple with one or both legs, when he catches or raises them more hastily and higher than ordinary, as if he were curvetting.

GRAPTOLITHI, in Natural History, are the petrified fossils of Linnaeus and others; as derrittine, landscape-marble, dendropotamites, &c. all which, according to Mr. William Martin, "Outlines," p. 8, should be excluded from the lift of extraneous fossils.

GRASS, GRAMENN, in Botany, See Gramina.

To enumerate all the species of grass 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 some few species, which are either used in medicine, or cultivated as a pabulum for cattle; for there is scarcely a pother 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-gras, rye-gras, darnel-gras, panic-gras, canary-gras, fox-tail-gras, cat's-tail-gras, hedge-hog-gras, cress-gras, cow's-foot-gras, buck-gras, and millet-gras. These and other grasses Linnaeus has arranged into distinct genera. See the following articles:

GRASS, Arrow-headed. See Triglochin.
GRASS, Bent. See Agrostis.
GRASS, Bird. See Bird-gras.
GRASS, Canary. See Phalaris.
GRASS, Capon's-tail. See Festuca.
GRASS, Cat's-tail. See Phleum.
GRASS, Chat. See Thelytrum.
GRASS, Cock's-tail. See Dactylis.
GRASS, Cotton. See Eriophorum.
GRASS, Couch. See Triticum.
GRASS, Crofted. See Dog's-tail-gras and Cynosurus.
GRASS, Dog's. See Triticum et Agrostis.
GRASS, Sea-dog's, a name sometimes given to the double fringed sedge, or rye. See Secale.
GRASS, Fescue. See Festuca.
GRASS, Fox-tail. See Lophioecurus.
GRASS, Goose. See Asperugo.
GRASS, Hair. See Aria.
GRASS, Hare's-tail. See Lagurus.
GRASS, Knot. See Polygonum.
GRASS, Knot. German. See Scleranthus.
GRASS, Knot, Mountain, and Verticillate. See Ille- 
GRASS, Crebrius.
GRASS, Loxo, or Quaking. See Briza.
GRASS, Meadow. See Poa.
GRASS, Hard meadow. See Cynosurus.
GRASS, Millet. See Milium.
GRASS, Oat, a name given to a species of the fescu-
See alio Avena.
GRASS, Panic. See Panicum.
GRASS of Paraphis. See Paraphis.
GRASS, Pepper. See Phalaris.
GRASS, Pudding. See Mentha.
GRASS, Quaking. See Briza.
GRASS, Rape. See Pedicularis.
GRASS, Refs. See Spergula.
GRASS, Ryf. or Rye. See Lolium et Hordeum.
GRASS, Scopion. See Scoparius.
It is also asserted by Mr. Kent, that meadow and pasture-kind is oftener neglected than ploughed ground, notwithstanding it generally admits of a much greater proportion of improvement. The best grasses cannot be collected at too great an expense; for he has been a small spot of land, in the middle of a large field, 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.

Mr. Anderson has likewise observed, in the second volume of his Essays, that although it is probable, that none of the grasses that have been hitherto cultivated by the farmer are of the most proper kind for pastures, 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 ease 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 unimproved, 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 neighboring fields, will there take root, and in time establish themselves. And it may sometimes happen, that some of the most valuable pastures-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 grass should abound in the neighborhood more than the good, the field will as naturally become filled with the seeds 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, 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 pastures-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 no roots of bad grasses, nor seeds of robust annuals, in the field when it is left out from tillage; and the seeds of the most valuable kinds of grasses must be in the neighborhood in such abundance as to fill the whole field sufficiently at once. Nor is this all. For as there is no doubt, a confid’rable 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 better on another soil, or upon that soil only in certain peculiar circumstances; it must so happen, that these very plants which are best adapted to the soil in the field may be in at the time the field will be found the abode of the neighborhood of the field. Neither must there be found near that, any fort of robust quick-growing plant, the seeds of which, by being blown upon that field, might suddenly rush up and inundate 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
any proportion, might tend to diminish the value of the pasture.

Now, let any one reflect on the infinite diversity these few particulars may admit of, and think how utterly impossible it is that all the favourable circumstances, without any of those that are unfavourable, should concur in any one case, 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 must, on that account, of necessity be good, act in direct contradiction to the plainest dictates of reason and common-sense. For, although it should be allowed that the grasses hitherto cultivated are not of the most proper sort 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 these; yet it by no means follows from thence, that if the farmer were perfectly acquainted with the value and distinguishing qualities of each kind of natural grass, and knew the soil and culture that best agreed with it, the most proper manner of rearing it, and every other particular relating to the economy thereof, he might not perhaps have it in his power to form artificial pastures as much excelling the natural as these last at present usually exceed the former. For were he possessed of the knowledge above apposed, he could at once fill the soil with the seeds of those valuable grasses which he knew were best adapted to it, and thus effectually exclude the admission 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 concerning ourselves on all occasions with such pastures or grasslands as nature may afford, 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 affinuity 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 will then doubtless make many valuable improvements. It is, however, to be feared, that till some attempt shall be made to ascertain the particular qualities and peculiarities of the different kinds of grasses, the public will be often imposed upon by specious accounts of new grasses, which may be really possessed of few valuable qualities, and may very much tend to discourage the inquirer. It is consequently necessary, to strenuously endeavour to discover what are the particular purposes for which any one plant could 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 distinction, it may often happen, that we may attempt to rear a particular plant for purposes which it was never fitted to answer; and our want of success in these trials may make it be entirely rejected, even in cafes for which it was extremely proper and beneficial.

It is stated that ray-grasfs continue to be the only grasses whose seeds can be purchased for the purpose of laying down meadow and pasture-land; and how inadequate that grass is for such a purpose is known to every intelligent farmer. Why indeed the Lolium perenne (ray or rye-graFs) should originally have been made use of in preference to all the other grasses, cannot, perhaps, be satisfactorily accounted for: most probably it owes its introduction to accident, or to its being a common grass 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 grass in its strict sense, that are growing wild in this country, the Author of nature should have created only one as suitable to be cultivated for pasture 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 feedsmen in moat 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 clafs of men adheres more pertinaciously to old prejudices than that of farmers, and the difficulty of distinguishing the grasses from each other has, too, no doubt, proved one grand obstdcle: many of these plants are so much alike, that the most discerning botanist is often at a loss to know some of them apart; if so, 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 observation of them, by persons who neither knew them well as botanists or agriculturists, or who have recommended 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 improvements, have not had the means fairly put into their hands to make the experiment, there having been any easy means of obtaining such sorts of grass-feeds as may be most fit for the purpose. It appears, however, that in the herbage of good meadows, or grass-lands, there should be a combination of producer, hatching, and early growth. The first is, in most cafes, the agriculturalists' 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 spares 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 grass, meadow-sweet, and such coarse plants. Grasses which have been recommended for being remarkably grateful to cattle, as the sheep's-fescue grasfs, or for the sweetness of their foliage merely, if they are found to be deficient in the grand article of produce, will never answer the farmer's or grazier's purpose, since he must have 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 grasfs, as of the fine bent (Agrostis capillaris), and procumbent trefoil (trifolium procumbens). Moreover, cattle are known frequently to thrive on food to which they are habituated by necessity, though at first they could scarcely be prevailed on to touch it. Perhps, 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 most insignificant vegetable will often make a great show, when its fibres have fresh 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 shows, then, that at the same 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 nutritious 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, sainfoin, tare, 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 arises 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 unite in complaining 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-flaked meadow-grasses, will effect all that can be expected from those of British growth: much, very much, however, will depend on meadows: 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 meadows, our pastures should be warmly situated, not draped with moilure, sheltered by thick hedges, and divided into small enclosures: in future, a few 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 desideratum, other plants, as well as grasses, may deserve a place amongst them, as rib-wort, or rib-grass (plantago lanceolata), dandelion (lentodon taraxacum), 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 furthest, a meadow of this sort 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 sorts of meadows, one for hay, the other for pasture; that our hay-meadows should confine entirely of grasses, and chiefly for this reason, that the hay would on that account be much fouer made; an object of consequence at all times, but more so when the proceeds commences in May. In June and July the more powerful heat of the sun is able to exicate the thick leaves and stalks of the more succulent plants; but, in the necessary prolongation of this buffet; the grasses must materially suffer. But for the purpose of pasturage, the attention of the agriculturist should be chiefly directed to such sorts of grasses as have the propensity of running to leaves, in preference to such as abound more in flower-flaks or stems.

The same writer states, that if we examine our meadows, pastures, and downs, we shall find them pretty much in a state of nature, and, excepting those pastures which of later years have been sown with ray-grass and clover, full of an indiscriminate mixture of plants, some of which afford good, others bad food, some good crops, others scarcely any crops at all; but that he may not be thought to speak at random on this subject, he will state a few facts to corroborate what he has said. His worthy and much-esteemed friend, Thomas White, esq., 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 Sussex, a turf, which, though not more than six inches in diameter, and chosen indiscriminately, produced, on being planted in his garden, as follows:

Different Turfs.

**Turf from Selborne-Common.**—Plantago lanceolata, agrifis capillaris, avena flavefcescens, ductylis glomerata, fedula duri-frica, poa anua, cynnorum cristatum, trifolium repens, crepis tectorium, achillea millefolium, galium verum, hypo-cheris radicata, hieracium pilosella, thymus ftepyllum.

**Turf from Oakhanger.**—Trifolium repens, holcus lanatus, poa anua, agrifis capsillaris, agrifis paludiris.

**Turf from Dovtum.**—Ranunculus repens, loliun perene, holcus lanatus, prunella vulgaris, fedula durifcum, agrifis paludiris, trifolium repens, crepis tectorium, achillea mille- folum.

**Turf from Glynd-bill.**—Medicago lupulina, achillea millefolium, poa pratensis.

**Turf from the same.**—Avena flavefcescens, fedula durifcum, fedula ovina, hieracium pilosella, agrifis capsillaris, trifo- lium repens, thymus ftepyllum.

**Turf from Short-Heath.**—Felucca bromoides, aita precox, jucuncs campeleris, poa annua, agrifis capsillaris.

**Turf from Mount Coben.**—Rumex acetofa, daucus carota, medicago lupulina, poterium fanginiforme, fedula durifcum, avena flavefcescens.

**Turf from Ring-moor-Down.**—Linum catharticum, secbiosa columnaria, ornithopus perpullis, avena flavefcescens, fedula durifcum, trifolium repens, hypo-cheris radicata, crepis tectorium, lotus corniculatus, jucuncs campeleris, hieracium pilosella, fedula ovina, thymus ftepyllum, poa pratensis.

It is, perhaps, no small recommendation to the poa tri- fals, that it is a principal grass in that uncommonly productive meadow near Salisbury, mentioned by Stilligley, 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 acris, triticum repens, agrifis paludiris.

**Turf 2.**—Poa trivialis, alopecurus pratensis, triticum repens.

**Turf 3.**—Poa trivialis, agrifis paludiris.

**Turf 4.**—Poa trivialis, triticum repens, peucedanum flavum.
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Turf 3.—Poa trivialis, alopecurus pratensis, agrostis palustris, arena elatior, triticum repens.

This experiment proves, in a great degree at least, what long before suspected, that the extraordinary fertility of this meadow arose not from any new grafs peculiar to it, but from several unusual circumstances concurring and favouring in an uncommon degree the growth of certain well-known grafs, especially the poa trivialis and agroftis palustris; consequently, in the forming and improving of grafs-lands, the most certain plan will be to cultivate the seeds of such grafs 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 seeds 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 grafs. If the winter should be very severe, though natives, as feedlings, 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 soften their roots in the earth, which the frost generally loosens; 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 feed 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 separate, should be divided and transplanted, so as to form more rows: the roots of the smooth-tailecl meadow-grafts in particular, creeping like couch-grafts, may readily be increased in this way; and thus, by degrees, a large plantation of these grafs 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 grafs most affected by his soil, and carefully to gather the feed 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 frequen the trouble of selecting the heads as they lie in the swath; but who determines not to be so particular, will thresh out the feed together, either in the field or before it shall have heated in the mow. And good feeds of different sorts of grafs may now also be procured from different feedmen in large towns and other places; but the collection made under the title of hay-feeds should never be trusted to in any respect. Mr. Curtis, from the numerous applications that were made to him by gentlemen for grass-feeds, 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 fanguine hopes of its proving a great national advantage. The grafs he has recommended will, he is confident, do all that our natural grafs can do; they are fix 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 grasses, 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 list comprehends the anthoxanthum odoratum, or sweet-crested vernal-graft; the alopecurus pratensis, or meadow fox-tail grafs; the poa pratensis, or smooth-tailed meadow grafs; the poa trivialis, or rough-tailed meadow grafs; the fatisfus pratensis, or meadow-feruge grafs; and the cynograsus trifolius, or crested dog's-tail grafs; of which representations may be seen at figs. 1, 2, 3, in Plate Grazis, Agriculture, and figs. 1, 2, 3, in Plate Grazis: 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 grafs, the meadow fox-tail and rough-tailed meadow grafs are fitted for moil lands; the meadow-feruge, or sweet-crested vernal, are the mott proper for land either moil or moderately dry; and the smooth-tailed meadow-grafts 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 grafs; they will not stand the drought of hot parching summers; in such seasons, they are only plants which feed down roots to a great depth that can be expected to look green or be productive, as the lotus cornuclum, medicago falenis, and some others.


It is observed that many more grafs might be added to this list, and those too which perhaps might be highly deserving of its; but he has his doubts, whether by recommending more he might not increase the difficulty of introducing grafs-feeds without any adequate advantage in return.

But besides these, the fatisfus nigra, or sleep's-feruge grafs; the fatisfus duriculata, or hard-feruge grafs; the poa comgrass, or flat-meadow grafs; the poa palustris, or marsh-meadow grafs; the phleum nodetum, or knot-grafts; and the fium serece, or rye-grafts, which is an useful grafs in many cases; may all be employed with advantage. They may be seen at figs. 1, 2, 3, in Plate Grazis, and at figs. 1, 2, 3, in Plate Grazis.

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 grafs-lands, such as the alopecurus bulbifus, or bulbous fox-tail grafs; the fatisfus rubra, or purple feruge grafs; the balton mollis, or creeping soft grafs; the plantago angustifolia and tenuefia, or narrow-leaved and small grafs-leaved plantain or rib-grafts; and the poa precumens, or creeping meadow grafs.

In a valuable ‘‘Essay on the Conversion of Grafs-Land into Tillage,’’ inserted in the Communications to the Board of Agriculture, vol. iii, part 2, the following detail of several plants of the grafs 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 lawns, 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 heap-fed, for which it is singularly adapted. Mr. Peacey's two varieties of it are said by some persons who have tried them, to be superior to the common sort. Mr. Professor Martyn, he says, states the cyperus ericetorum, poa nemorals, brown moss, alopecurus, Anthoxanthum, and poa pratensis, as all being earlier than the Lolium perenne, or ray." See Lolium Perenne.

"Yorkshire white (Holcus lanatus). This, he observes, flourishes well on any moist soil, and grows very generally, except on the most dry and barren spots, where, however, it is also found. It should be sown chiefly with a view to sheep, for it is not equally good for other flocks: many have cultivated it on his farm for sheep, and it has answered greatly when kept close fed. Mr. Marshall, 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 to closely remarked its qualities." See Holcus Lanatus.

"Meadow-festuca (Festuca pratensis). This is an excellent grass for good lawns and chaly feys, and he has found it abundant largely on dry lawns. He has laid down some parts of fields with it for comparison with other grasses on wet sandy lawns on a clay marl bottom, worth 15s. or 17s. 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 Eves, revived it, and began with the alopecurus." See Festuca Pratensis.

"Meadow foxtail (Alopecurus 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-festuca gives way to others. It has also been found, by Mr. Majendie, harder against frosts than the poa trivialis: the greatest objection to it is the difficulty of getting the seed in any degree of plenty; there is an infest 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 know advert in the infect which is so pernicious, as noticed by Mr. Majendie, and by the ingenious Mr. Swaine, in his "Graniin Palaena." In a field on his farm, where it is very well established, and the herbage thick, it produces very few seed-talks. See Alopecurus Pratensis.

"Creight dog's-tail grass (Cynodon cirsiflora). It is remarkable, that to judge from the appearance of the stems of this grass in poor upland but moist pastures, a man would think it a very unprofitable plant; but the rich marshes of Bridgewater and Boston, the famous pasturages of Panton in Devonshire, and those close to Mr. Bulleus' castle near Lostcard in Cornwall, Mr. Thorne's bullock-groudings on a limestone bottom near Tavistock, Mrs. Williams's at Little Malvern in Worcester NORE, (which are among the richest pastures in the kingdom), all abound, he affirms, 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 belt 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 food, so that he has had many bullocks gathered in a feofon by poor women and children, at one falling a pound, and laid down many acres with it sufficiently. Attention should be paid to its being ripe; for it needs red eight bullocks to be sown on eight acres, and it failed from deficiency in ripeness." See Cynosurus Cirsiflorus.

"Roughed-tailed meadow-grass (Poa trivialis). It is observed that Mr. Bova, of Bedhampton, 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 acid loams. It is accounted in Lombardy the queen of meadow plants (la regina delle erbe), either for dry pastures or water meadows; multiplying itself much by seed, and little by the root: so that, if not to be paid to permit some feed to fall, its quantity will sensibly 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 Sir William Clayton, of Hereford." See Poa Trivialis.

"Cock's-foot (dactylis 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 grow in a few years to the indigenous produce. If tender to rise high, it is very coarse; but, fed close, is a very valuable sheep-pasture. Women and children make good earnings in gathering it at 4s. a bushel. He has found two bushes an acre, and sells 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 stated in the Norfolk Report on Agriculture, that "Sir Mortain Munt, in 1798, observing, at an experiment, that this grass grew four inches in less 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 baulk that was full of it, and there ate in preference to other grasses. In some parts of Norfolk it is called cows' grass, from their being 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 sows it with second, instead of ray-grass, and finds it much more profitable." And Mr. Orman also, observing the carynalis with which the s. when let into a field at Burnham-market that had some cock's-foot grass in it, ran over ray-grass, and every thing else, to get a bite of this plant, thought it worth cultivating, and sowed 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 1792, and convinced him of the excellence of the grass. He also showed the writer "a beautiful crop of dried wheat, which could scarcely be estimated at less than four quarters and a half per acre, pointed out a part of the field, superior, 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, resolved them to be too strong; that he had some idea if they might extend the
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the land, and therefore sowed this piece for a trial: the
result has satisfied him that all apprehensions of the kind
was ill-founded, and he intends fulfilling 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 GLO-
BATA.

"Tall oat-grafs (Avena elnior). 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. Swany's experiment, it
yielded a greater weight than any other grafs." See Avena
Elitor.

"Timothy grafs (Phleum pratens). This grafs is repre-
sented by all travellers in America, he observes, as the
great support of cattle, &c. wherever meadows are found;
and it is asserted to have considerable merit. He has several
times made the trial of keeping it close fed by sheep on a
moist loam, upon a clay made bottom. The success was
very encouraging enough, he thinks, to prove that it is
an object, in this line of husbandry, which merits con-
siderable attention; and the more, as the seeds are to be had,
very clean dressed, in any quantity from America, at 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 loams, and especially peat." See Phleum
Pratens.

"Yarrow (achillea millefolium). This, he affirms, 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 success as a sheep-pasture for some
years. It is found on moist loams almost equally with dry
burning sands, gravels, and chalks. It has a singular qua-

tily of retilling drought on the moist arid sorts; so that, if
you see at a distance a green spot on a burnet-up, clofe-fed
pailure, twenty to one but it is clothed with this plant.
It is found in the richest meadows and bullock-paillures.
Five hillings per bushel are given for gathering the feed
in October: it is a plant deferring great attention. Sheep
are very fond of it. It is said to form a fourth-part of the
herbage of some of the fine meadows of Lombardy."

"Burnet (poterium farigifol). It is remarked that there
are large tracts of the finest parts of the South Downs
upon which this plant forms half the indigenous pasturage.
It abounds much also on all other chalk downs; but it will
flourish on any soil, on sand, clay, peat, &c. Some writers
speak of it for cows: it has been cultivated on his farm
these five and twenty years for sheep, for which animal it is
very useful. The grass is to be bought almost everywhere.
"See Burnet.

And it is observed in the Agricultural Survey of Nor-
folk, that this plant was "introduced at Stoke 35 years
ago, as the writer then rifered, with great success; but
it never made any progress, though it yielded luxu-
riant food for many horses in February." However, "the
reputation of this plant attracted 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 small quantity of white
clover and rib-grafs with it. The result was as decisive as
can be imagined; the field has been fully and incessantly
fcocked with sheep, and was constantly pared as close to the
ground, as a favourite spot in a pasture is by horses." And
in other respects it is also valuable, as "Mr. Bevan has
found it to be the most wholesome food for sheep 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 affected that this
plant has hitherto been the main dependence of those who
have laid down land to grafs; and though, for sheep, it has
not the sweetness of some other plants, or of red clover, yet
upon the whole, it is one of the best that can be relied on
for all rich or dry lands, fands, &c. and also for rich and
drained clays and peats; but on poor wet loams and clays it
will not shine, but gives way to the water-grafs (agrostis fo-
lotis) and noxious plants, or other indigenous grafs.

There is no better field of good land, than its running sponta-
eously to this plant; from the fine loams on rock, upon
the Tamar, to the deep friable ones of Leicestershire, red-
clover, left unploughed, gives way to a thick covering of
this plant. Whatever feeds be fown, this clover should
form a part of the dependence for succeds. Mr. Bakewell,
Mr. Wright of Norfolk, and several other practical farmers,
made this observation, that flock has been known to
do badly, though there was much food on the ground; per-
haps that is precisely the reason; and that this plant, like so
many others, demands very clofe feeding to discover its
merit." See Clover.

"Trefoil (medicago fupelina). It is observed that, though
only a biennial, it is sure to fowd much feed that it rarely
wears out of land. It is a good plant, not at all nice in fole,
and the feed cheap." See Trefoil.

"Cow-grafs (trifolium medium). An excellent plant for
clays and firm loams. It is said, in the Lincoln Report,
that Mr. Ancel got good crops on a rabbit fand; the hint
is worth purifying, but he has not seen it cultivated on fuch
foils. 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 grafses coming: but he prepared by
two crops of turnips in fuccedion, and fowed with the barley
following. On fuch land as his, the practice is not to be
condemned, but on other foils it would fail entirely."

"Rib-grafs (plantago lanceolata). It is affected that upon
rich fands and loams this plant gives a coniderable herbage,
and on poorer and drier foils it does well for fheep; but that
it is inferior to some others. Mr. Marshall observes,
that it has fowed the fteff of yearts' established practice in
Yorkshire, and is in good effimation; though not well affect-
ed by fories, and bad for hay, from retaining its fap. The
eminent Haller informs us, that the alifting richnefs of the
famous dairies of the Alps, defcribed by Scheuchzer, is
attributed entirely to the plenty of this plant, and the albe-
milla vulgaris. The feed is always plentiful." See Plan-
tago.

"Lucern (medicago fativa). This is more confined than
any of the other plants. A landlord whofe, he thinks, only
flipulate for it on very rich, deep, fribale, dry, found, mellow
foils, and fertile fands, worth 50n. an acre. Upon fuch
foils, he cannot do better than to encourage it among the
temenity, to be fown broad-cast, 20lbs. an acre, and to re-
main while productive, which will be from twelve to fifteen
years. On fuch foils it will, he fays, support more fattle
than any other plant." See Lucern.

But more full accounts of thefe grafses will be found under
the differentheads which are referred to.

With r espect to hay-feeds, it is defcribed that the only cafe
in which these are admissible is, when a perfon has a very clean
and valuable meadow or paifure which he faves with a view
for feed; drawing out the bad plants while the crop is on
the fowth, and threfhing the produce on a cloth, after flan-
ing till the feeds be ripe. Thus managed, excellent feed

may
may be procured with ease, and be beneficially employed in the forming of grafs-lands.

In regard to the arrangement of these different grafs, 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 grafs or woad. See Laying Land down to Grafs.

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 seed cannot be procured but with difficulty: some perennial vetches, clovers, meilots, lotufes, &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 *viola fepium* 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 woad, lists containing the proportions or quantities of different sorts of grafs-seeds suitable for different sorts of land, are offered to the attention of the cultivator. See Laying Land down to Grafs.

It is remarked in a general way by the same writer, "that if the land laid to grafs intended for sheep, it is not an object of very great consequence to low only the finer grases; as clove feeding after the first year will make any grases named in the lists fine, sweet, and productive; but this effect depends altogether on its being constantly fed clove, that is, all feed-items being prevented from riling. Every good farmer is sensible of the necessity of this with ray-grases, but most unaccountably does not extend a similar concern to other grases. Above 200 acres under the author's management have been laid down to grases, chiefly for sheep; and he has stocked the fields so early in spring, and so thickly, as just to keep down the feed-items: the cock's-foot, oat-grases, and Yorkshire white, with this management, have proved sweet feeding grases, not at all rejected, even in fields where the flock had a choice. Several writers seem to have been very sensible of the consequence of close feeding. Mr. Davis, in the Wiltshire Report, says, "the sweetness of the seeds on the downs of Wilts depends much more on its being kept close, and eaten as it blosoms, than on any particular good quality of the grases: for there are many downs that, when clove fed, appear to be a very sweet pasture, but which, if suffered to run a year or two without a full flock on them, will become so coarse, that sheep will al- most as soon starve as eat the grases."

And in the Survey of the County of Stirling in Scotland, it is stated, that, upon Benlomond, &c. the paituring of sheep has evidently, in the course of twenty years past, improved the quality of the herbage so as to raise grases of a good species, and in very considerable abundance, where nothing formerly prevailed but bad kinds of grases; and these in no great plenty: and the practice bids fair to banish heath from all the places that are paitured by sheep.

Further, Llile, who was the belt writer on husbandry we had for many ages, also remarks, "that there are poor foils which require a much longer time to grow a second inch than the friel, and that consequently on fuch it is much more probable to keep sheep than cattle."

The writer, on hift reading this passage, made the experiment on land of 122. and 132. an acre, clipping the plants with feliars, and carefully measuring and weighing the produce, and comparing it with neighboiig plants left to perfect their growth, the superiority was proportioned to the times of cutting. Sheep feeding not only, he says, ameliorates, by enriching the soil and fuming the herbage, but also by destroying weeds. Ragwort, with which the bullock-grounds of Limerick, 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, fow in the extreme with knolwed, cured by paituring it repeatedly in the spring with sheep. But here, a counter remark must be made, which is, that after a field has been paitured long with sheep, and clofe 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 grases, time immemorial, and kept fed for the last forty years at least, except one year in which it was mown, excepting a vail crop: the feaon was very favourable, but he was utterly disappointed, for the produce was small. He has known the fame thing happen on including an old common. In Scotland a familiar remark has been made by Mr. Wight: "Two inclosures of the fame fow were laid down together with grases-seeds of the fame kind: after two years' hay, the one was furrendered to paiture; from the other a crop of hay was taken every other year. After only years' absence, the proprietor returned home, and wanting more hay, mowed both, and that which had been paitured gave the work crop." Something like the fame thing has been observed in Switzerland, as stated in the Transactions of the Bern Society. It has occurred also in other infances.

With regard to the forming of grases or woad, the procuring of good feed has been found, from long experience in every part of the kingdom, to be of all other works the work executed by tenants; they sow the cheapest feeds which can be procured, that is, common clover or ray, or the rubbish of their hay-lofts: the clove gives a crop the firl year, but, as it wears out, all sorts of trumpery succeed, if the fow 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 grases, to have proper sorts of grases-seeds provided. About 25. will purchase the feeds in most infances: the expense may be reckoned from 2s. to 3s. per acre; but depending on various circumstances, as the state of markets, and the price of labour. Of the feeds recommended, the following are to be bought in any quantitie: cow-grases, Yorkshire white, Timothy from Ayrshire, white clover, trefoil, ray, burnet, rib. And dog's-tail and cock's-foot are easily gathered by hand. Most of the grases-seeds that have been recommended as useful in forming good grases-lands may indeed, now, we believe, be had of the different feedmen in London, and other places, as already noticed.

And the best methods of preparing the land, sowing the feeds, and managing the new grases-lands, are considered in treating of the practice of restoring arable lands to grases. See Laying Land down to Grases.

Grasses, Artificial, a term signifying that kind of grases that is produced by the sowing of the feeds of different sorts of plants that have a quick and luxuriant growth on arable land; as those of the red or broad clover, joint-grass, trefoil, teas, rye-grases, and other similar kinds. They are shewn at figs. 1, 2, 3, in Plate Grasses, and at figs. 1, 2, 3, in Plate Grasses, in Agriculture.

There is likewise several other plants of this nature, that may in all probability be employed with great advantage in the same attention. And it has been stated by a late practical writer, that "though the chief hinge on which modern husbandry has been made to turn is that of the introduction of these sorts of grases, it is extraordinary that they have yet, in but few districts, been made to constitute a part of the
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 effects the effect of excessive drought on the dryfield soils, and increases the quantity of vegetable mould in all. It will grow on most soils, but is not equally productive; and whether it be mown and used in the green state, 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 horses, beasts, or fowls, and the land sown with wheat. In that case, two pecks of the bent 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 slake-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 to lay the land down to salt, three, four, five, or six years. In the case, it is adviced that the farmer should sow the following seeds, in those proportions per acre:

Names of Seeds. | Quantities.
---|---
- Cow red-clover | 4 pounds
- White clover | 4 ditto
- Trefoil | 4 ditto
- Ray-grasses | 2 pecks
- Vernal grafts | 2 ditto
- Sheep's-tfene grafts | 2 ditto
- Camel-dog's-tail grafts | 2 ditto

"It is supposed, that by this management, the soil would acquire a vast increase of vegetable mould, and, by the pastures maintaining one-fourth more flock than it did before, it 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. Pridis, of Eggmore, was recommended by a friend, whole management he had seen and approved, to sow his seeds at twice: half of each foot (white and red clover, and ray) at the time of sowing barley; and the other half before the rollers in going over the young crops; and this practice he intends to pursue in future. He thinks it will give them a better chance of succeeding. He has 600 acres of seed-wheat and the great proportion of 15 lb. an acre of white clover, 8 lb. of red, and one bushel of ray-grasses. The last he sows 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 is also further stated, that, "in 1684, in registering the husbandry of that spirited cultivator of Holdsway, it was remarked, that of 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 sown so repeatedly, that the land is said to be unfitted 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." This observation is so common, that no doubt can remain of the fact; however, it may be attributed to certain methods of management pursued in this county. Peas and tares had been tried as sublittizes, but they are tillage-crops, and what these thin foils, harassed with the plough, want, is red. 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 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 spiritorily upon 50 acres in the middle of a large piece, laid with clover and ray-grasses. The quantities of seed he has found will vary according to circumstances; but, in general,

Names of Seeds. | Quantities.
---|---
- Cow-grasses | 8 to 10 lb.
- White clover | 5 to 8 lb.
- Rib | 5 to 8 lb.
- Burnet | 5 to 12 lb.
- Trefoil | 5 to 8 lb.

according to the price, and also the intended duration of the lay. The facets of the first trial inducing him to lay down a yet larger space the second year. And the third (with the barley of the last spring), no fewer than 221 acres; this is, in truth, says the writer, doing justice to a new husbandry. Mr. Coke has found that those seeds 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 yet 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 there remarked in regard to land being tilled of this plant, that the observation he made, "during nine years that he was in the constant habit of viewing the farm of Mr. Ar-ebuthnot, in Surrey, merits some attention. When he began to farm, the land was sick of clover, infomuch, that it was almost bare to fail, from having been, perhaps for a century, tilled every four or five years. His friend adopted the course of 1. Beans; 2. Wheat; 3. Clover, 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 neglected. He began with ploughing treble the depth of that to which the land had been digitally tilled, and he manured very amply for every crop of bean, partly with night-soil, from London. In what degree the success arose from depth of tilage, and what degree from a variation in manuring, cannot be ascertained; but the experiment proved that these 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-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, when the land is
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It is further stated, that, upon such lands as the above, it furnishes a crop of hay in summer of greater considera-
tion than any other of the artificial grasses. The hay is excel-
 lent for all kinds of stock, and the after-math very good for
cattle in autumn, and for sheep in winter, till Candlemas.
Hence, faavour is a most invaluable grass on lime-done,
gravelly, and chalky soils; but it requires three years in
coming to perfection; hence the propriety of sowing com-
mon red-clover or trefoil along with it. And it should be
mown before it is in full blossom, otherwise there may be
loss in that way. See Saintfoin.

Lucern is alerted, by the above writer, to be the most
productive, and that which comes into use sooner than any
other of the artificial grasses. Horser, 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
seed should be drilled on an acre, in rows of eighteen inches
apart, and one inch deep, with a row of common red-
clover between each; thus be-larrowed 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. As soon 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 tread upon the young lucern. And as soon
at 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 per-
feciion; 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 sort. This plant, though little cul-
vat ed, is highly valuable, either green or in hay for horses
and cattle, and is an excellent winter food for sheep. It
de-lights most 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 is to be ploughed for the last time, and har-
rrowed well; after these operations, four pecks of seed
should be sown broadcast upon every acre, and then buh-
rarrowed and rolled. And it is suggested, that, as the pro-
per season for sowing is the latter end of July, it becomes
an excellent fucellatum 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 seeds, when the land is to be
laid down in these proportions:

<table>
<thead>
<tr>
<th>Names of Seeds</th>
<th>Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnet-seed</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-grass</td>
<td>1/2 peck</td>
</tr>
<tr>
<td>Ray-grass</td>
<td>1 ditto</td>
</tr>
<tr>
<td>Creelit dog's-tail</td>
<td>1/2 ditto</td>
</tr>
<tr>
<td>Sheep's-feather</td>
<td>1 ditto</td>
</tr>
</tbody>
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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 seeds 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, in fact, the poor man's harrow. It is sown in the Norfolk Report, that "Mr. Bevan sowed an acre of poor land, worth not more than 21. 6d. rent, with chicory in 1793, and that the next year it produced 7½ 12s. 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 merits trial, he thinks, on every soil in it. The objection which has been founded on its not being easily extricated, is, he contends, of no importance, for tares should be sown after it on some soils, and turnips on others, in which sytem, its distinction is unquestioned. "This hint should not slip the notice of cultivators in other districts."

Summer Time.—This is a plant of the kind, which is much employed as summer-herbage, either pathed 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 use it is intended for. When for summer-herbage, &c. it matters not how early the seed is sown, provided no hard frost ensue. 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 succeditions of them, to the great convenience of summer-feeding, but when for daubing and for fattening, it will be prudent to wait till the tares have gained a sufficient increase of haulm, before the stock are turned in upon them. And when for foiling horses, &c. they should be sown before they flower; and in no instance should the haulm be suffered to become rotten near the surface of the ground, which frequently happens on rich soils and moist feans. If for hay, as a substitute for red clover, the seed should be sown as early in March as circumstances will allow; but the time of mowing is more optional. Some sow them when the blossoms are fuller; others, full before they are quite ripe. But, in either case, the same caution is necessary, as in making foils 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 seed 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 use in cultivating this tare, the preparation of the land is the same; and this plant delights most in light sandy soils; and, in every case the land should be ploughed and harrowed once in a place, before the seed is sown; then sow the seed broadcast at the rate of three bushels an acre for the first and second uses, harrow the land well afterwards, and then lay it dry.

"The great objects in cultivating this tare are, 1st. Spring-food and foamer-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 use of this tare, August and September is the prime season for sowing the seed 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 seed 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 fort should never be neglected. See Artificial Grazes.

GRASS-GROUND, in Gardening, the parts of ornamented grounds which are kept in the state of lawn short grass or turf. Those 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 confant verdure, summer and winter, and open rural appearance, exhibit a fine imitation of nature at all seasons, especially when the site 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 rural ornamented, 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 spacious, they have a little need of their general appearance, as may be seen where long narrow slips 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 line 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 turf, but is generally more close, even, and smooth, as well as less apt to run up to benty grass, grow rank, or rife in tufts, than by the sowing method. The laying 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, find the points 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 levels on the pegs, afterwards treading, rolling, or ramming the whole down equally, that it may nowhere fink in hollows afterwards. When this has been finished, the levels should be wrought up more accurately, and the whole finished with a neat raking, clearing off all large flones, and making an even
even and smooth surface; in this state it may either be sown
with grasses feed, or laid down with turf.

For the first method the proper seed for sowing are
either February, March, and April, or in August or Sep-
tember in moist weather. In moist wet soils the former is
probably the best, but in those of a dry gravelly nature, the
latter. In this business it is of the utmost consequence to
procure good seeds; those from hay-stacks 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, you must be obtained
from the feedman, and should be of those kinds which
strike deep root, spread out laterally in their tops, are per-
manent, and capable of withstanding the effects of heat; there
are many of this kind. (See Laying Land down to Grass.)
The seed must be sown 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 sur-
face: when the grass comes up, all weeds should be re-
moved; and the same reason, when the sward is become
thick and green, and advanced some inches in growth, it
should be mowed, rolling it well afterwards, and continue
mowing it and rolling two or three times the first summer,
especially if it were sown in spring, as the oftener it is
mowed and filled, the thicker and finer it will grow; and if
it be intended to keep the sward 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 moderate 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
pastrured common or down, where the sward is fine and short,
with considerable cloveness.

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 use is mostly cut by a plow with an iron
implement called a turning 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 first marked by a line the proper width,
length, and depth, and then cut with a racer or cutter, fir
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 close and tight, the grass side in-
wards, and piled up by tens, especially if they are cut by
the hundred, which is mostly the case. This is usually done
at about a shilling to fifteen pence the hundred, accor-
ding to the nature of the soil, as, whether soft and easy
to cut, or hard and stony. A man will cut from three to
ten, six, or seven hundred a day, with a person to trace
them out and roll them up as they are cut from the sur-
face.

The method of laying them is very easy: they are placed
regularly upon turf and turf, unrolling them as they are laid,
jointing them up quite close edge to edge, and making good
differences 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 planting in the middle of
the upper sides. With these beat the grass 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-grounds, after it has been
thus laid down, is that of mowing it in summer frequently,
to keep it short and fine, like the sward of a fine
pastrured down or common: it is performed with a short grass
fleythe; and dewy mornings, or moist weather, must always
be chosen for the work, as it will be impossible to mow short
gras properly in dry weather. Previous to mowing, it is
of advantage sometimes to pole and roll the grass 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 brokes of the fleythe, which has a very
unightly appearance; to prevent which, as much as possible,
the point of the fleythe should be laid out rather wide, an
inch or two beyond the measure of heel and point, especi-
ally for very short gras, keeping the point rather out, and not
drawing that part too fast inwards, gathering the gras
neatly to the left in a range; and after having mowed thus
to the end of the sward, to mow it lightly back again, in
order to trim off all scores, and other irregularities, unavoid-
ably left the first time in executing the work.

After it has been all thus mown over, proceed to sweep
up the mowings of each sward regularly, by standing in
the middle, sweeping it along alternately to the right and
left, to the end of the sward, forming all the gras in a
range on each side; then sweep up the ranges in large heaps,
and carry the whole off directly in a wheel-barrow, large
balket, or other contrivance for the purpose.

The busines of polishing is performed by a long, taper,
pliable, alken pole, fifteen or eighteen feet long, by paffing
it backwards and forwards, in rather dry weather, so as to
break and scatter the worm-calls about. The gras should
be afterwards rolled with a wooden roller, when the sur-
face 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 moist,
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 move close, even, and more expedi-
tiously. See Polishing.

In the rolling of short grass-grounds, it should be per-
formed 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 plasters and daub

GRASS.
GRASS.

... the grass, and render it unfitly; the heavy iron, or stone roller, should be used occasionally, when the surface is dry, to press down inequalities, so close as to prevent 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 buffness of rolling 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; having a large roller for the purpose, with shafts like a cart, and the horse at the time wearing a fort of leathern 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 defaced by wild dainties, dandelions, or other weeds, the first may be removed by having the blade of an old broad-sword 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 dainties at a great pace; which may be repeated two or three times a-week, or as often as there 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 grass should be generally cut down as close and even as possible, that the sward may remain in a neat even surface over the winter season, 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, plots, 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-HEARTH, in our Cylfaun, greening, or turning up the earth with a plough. Hence the customary service for the inferior tenants of the Manor of Amherst in Oxfordshire, to bring their ploughs to do one day’s work for their lord, was called grass-hearth, or grass-hart.

GRASS-HUSBANDRY, that fort of husbandry which has a relation to the management of grass-land, or such as are under the condition of sward. This, in a great measure, consists in the proper clearing, managing, parvuring, or feeding down, shutting up, cutting or mowing, 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 most coarse and wretched state, being over-run with various kinds of coarse and aquatic plants, as well as those of the mosses, and other descriptions. See Husbandry, Grass, Meadow, and Pasture.

GRASS-LAND, that fort, or description of land, which is mostly preserved in a state of herbage or sward. The forts of land that are the most adapted for this purpose are, according to some late writers,

1st. Such as are situated 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.

2nd. Such 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.

3rd. Such lands as lie in valleys of mountainous countries, especially chalky soils, where old meadow-land is scarce 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 sward-land.

And 4thly. All such cold strong ground of the grass kind, which, if ploughed up, would not be applicable to the purposes of the turnip-husbandry, or those of modern farming, and which, under the best practice of wheat-husbandry, would not be so valuable as they are at present in the condition of sward.

The forming of grass-land is effected with different degrees of difficulty in different instances; in some parts of the island it is accomplished, in general, with great care and facility, the soil having a natural tendency to the production of grassy herbage, when left in an unploughed state, reverting to pasture without labour, expense, or even the fowling of feed; while, in other cases, all the art of man has been found ineffectual, to make good grass-land. Even after 20 years fruitful expectation and expence, the land-holders have often been obliged to restore the ground again to a state of tillage-husbandry.

It is remarked, that consequently the great difficulty in this business is to discriminate what sort of land is suitable and proper for grass, and that which is improper for the purpose. The beast meadow-land does not always make the best tillage-land, nor does the best arable-land always make the best pasture, but frequently the reverse. To make this discrimination, it is necessary to consider well the procefs of nature in propagating and perpetuating grasses. The great object of nature is to perpetuate all her species; but upon the plants created for the support of animals intended for the food and use of man, the fperms to have hallowed 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 assistance of man is required to obtain viviparous production, by grafting, budding, &c. But, in grasses, 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 grasses, the root performs the same office. Grasses 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 grasses must necessarily be frequently cropped by animals, nature makes up the deficiency by an increase from the roots. Most of the beast grasses 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 seed, as being increased instead of being injured by the biting and treading of animals, and by the produce being perfect in one year instead of waiting two, as in the production by seed. But this proceeds does not go on succexfully, unless the land is peculiarly apt for the production of grasses. If it is too wet, the grasses will be injured in the winter by rain and frost, and will soon be superfed by rushes and other aquatic plants: if too dry, they will be killed by the summer’s heat, and give place to mosses, fern, heath, &c. No land will, it is conceived, make a good meadow, unless it is deep enough to admit the roots of grasses 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 absorbent under-drain 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 food may be provided for such animals as may...
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 substancess of the absorbent defecrion to the surface of the land. They should likewise be carefully eradicatss from the hedge-rows of grass-lands annually, and by that means be prevented from spreading themselves over the ground by their seeds. By this practice, the hedge-lands 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 obstructions which impede the production of perfect sward, such as the growth of mosses on their surfaces, and the continuance of cattle dung-hills, ant and mole hills, as well as those of sticks, thorns, and other similar substancess. The proper methods of removing these are noticed under their particular heads, and in the kind of meadows-lands, and pastures.

According to the Agricultural Survey of the County of Hertford, in harrowing, with a view to destroy mosses, no benefit has been found to be produced, though the molly material has been well torn up. It is advised that manure should be laid on at the same time; but that where ashes are spread 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 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 out 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 large patches 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 impregnation 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 conformation that is effected; as it is only by this means that the insects can be prevented from carrying their operations; a certain state of lightness as well as linen-feet 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 the ant requires the situation and foil 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 irrigate 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-foil, 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 stiff yellow clays, a Hertfordshire farmer has found the practice of draining, according to theEffex mode of carrying off the surface-water, useful, though this practice is totally unliked by his neighbours in the same parish. Experience has convinced him, that dreading 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 foil, and this he does by every kind of compol carried on it for two or three years together, which he finds establishes a better sort of grass than dreading once in three years on the surface.

It is suggested that the comfort of feeding the first year, instead of mowing, is a practice that must be preferable or not according to the nature of the foil, and the object of converting it into grass-land. With respect to the manner how he has found, that if he was to allow even the treading of the first year after the grass-feeds is down, he should fill the surface with receptacles for water, and should have very little, if any, grass of a coarse quality, notwithstanding his diet; because the meadow or cattle would press the dry foil so close, that the water could not penetrate into them; whereas, if he flouts his field, suffering the grass to stand till it feeds the feed, he finds the following reason that he is enabled, by giving only a slight dreening, to cut a good crop of hay from it. And in cases of old worn out thin patches or molly 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 grass-feeds down the thin or patchy parts, as in this way the grass-plants become more strong and vigorous. In performing this business, Mr. Amos has advised the use of a machine for scarifying and dreading grass-land, whether it is to be mown or depastured 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, dreading the land one way is sufficient; but, if the sward be very molly or adhesive, it should, he thinks, be drenched length and crois 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 sowing seven pounds of white clover, four parts of wild or cow-clover, four parts of trefoil, four parts of rib-grass, and one peck of bell rye-grass seeds, per acre, previous to its being drenched or but-harrowed, and then cleaned and rolled. It is supposed that by dreading land in this way, moss is torn up, ant and molehills levelled and destroyed, the roots of the gras cut and horse-hoed, which causes them to throw out fresh lateral shoots or limbs, the sward thickened, and the surface made so clean as to put on the appearance of a perpetual spring when close fed down. And that, by such management, and grazing as much stock as will keep the grass in a young succulent state, and hooving or mowing all the tufts and weeds three times in the course of the summer, the grazer will be enabled to receive every benefit from his land, and likewise prevent
GRASS.

prevent the influx of several grases from running into seed, and being injured in consequence of it.

But another method of improving gras-lands, practiced by Mr. Salter of Norfolk, is said to be original, and of great importance. It is stated in the Norfolk Survey lately published, that "upon his large farm of above 800 acres, he found 3 or 400 acres of old meadows entirely poisoned by springs, which, from every sort of impediment that neglect could cause, had formed bogs and moory bottoms, famous for rotting sheep and miring cows; with blackthorns and other rubbish spread over large tracts. His first operations were to grub and clear the land, and open all ditches to the depth of four or five feet, and to cut open drains in almost every direction for leading them dry; burning the earth, and spreading the ashes on the ground: so far, the reporter says, all was no more than common good husbandry; but he applied a thought entirely his own: as he found that the flinty gravel, marl, and other earths, but especially the gravel, was very beneficial to the herbage, he thought of sowing winter tares and white clover upon the places wherever any earth was spread, or any other operation had laid bare the surface, harrowing in those seeds. The writer had the pleasure of seeing several of these crops growing: the success has been uncommonly great; for the land thus fown not only has given large and very profitable crops of hay, but has also received a rapid improvement in the herbage: the cover and fronde of the tares, so beneficial to all land, mellowed the surface, and seemed to draw up as well as protect fuch of the old plants as received improvement from the manure, and exhibited a much superior fteece of grases to any fpoets where this fingular management had not taken place. So that nothing can be clearer, on viewing this large tract of meadow, than the superiority of the improvement resulting from the growth of the tares; the effect of the manure is much accelerated and rendered greater."

The reporter further hints, that "the idea is certainly applicable to many of the gras-lands of the kingdom, especially such as are improving by the addition of chalk, marl, clay, loam, sand or gravel: 40 leads an acre of any of these bodies will much improve coarse or wet, or moory gras-lands; and then to add fares secures an immediate profit, and makes the manure work much sooner and more powerfully. He fows some late as the middle of May. An idea here strikes the writer, which he shall venture to add; that "if he was to fear any moly, hide-bound, or poor pastures, &c. it should be with a drill-scifier, drilling in winter tares by every tooth of the scifier; and he has no doubt but the tares would take well, and effect a considerable improvement, even without manuring." It is stated in addition, that "Mr. Salter has practiced the tare husbandry on meadows for ten years, but his first beginning was fourteen years ago, at Ellingham: the cockeher-grubs had destroyed a part of a meadow; he harrowed in tares and seeds, and the success was great." It is also stated, that "tare-feeding running short, he this year sowed peas and oats mixed on some spots, and they are found to do well; and this husbandry he pursues, whether he intends mowing or pasturing. The writer considers this a discovery of vast advantage to gras husbandry in general.

And it is likewise observed, that "Mr. Bevan's arable land, at Riddleworth, joining to his low boggy meadows, gave him the power of cutting land down hill at an easy expense; and thus he improved some parts of those meadows to great effect: from 100 to 150 loads an acre were spread at the expense of 4l. or 5l.

Statement of Expenses.

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>A team of five horses, 30 loads a day, and wear and tear</td>
<td>0</td>
<td>12 6</td>
</tr>
<tr>
<td>Driver</td>
<td>0</td>
<td>1 6</td>
</tr>
<tr>
<td>Filling, at 2d.</td>
<td>0</td>
<td>5 0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>19 0</td>
</tr>
</tbody>
</table>

In 1802 this method answered very greatly: these meads were then not capable of irrigation, but one meadow has since been watered, and the water has taken much greater effect on account of the fencing, 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 greatst advantage and success. There is likewise a similar method of improving old rough and boggy meadow-land def erbed, with a plate, by a writer, under the title of Agriculture, in the first volume of the second series of the Agricultural Magazine, as practiced by Mr. Riis 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 rotten in many places, and at least three parts of the four so over-run with fedge and rushes, that its utmost annual value would scarcely be estimated at more than eight shillings each 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 inapplicable for an horse, and scarcely safe for a man at certain feasons. It is observed that the first scver the present occupier took was, as soon after Michaelmas as he could, to cut the drains, as he has flewn in the plan; all of which are covered, except the main drain, and the two ditches. These latter are cut both wide and deep, and are the chief operating checks 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 unbound parts, very finely after the first process was completed), 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 drizzled; and where the roller could not work, from little inequalities of ground, he dibbled the earth mentioned in the annexed schedule, harrowing the small seeds 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, consisting of rye-gras, Ditch-clover, and good natural grases. There are certainly some rushes yet, but far less numerous and strong than heretofore, and which it may juicly be expected a few sweepings with the scythe, and hard rocking with sheep, will in time wholly destroy. But though there may not be much
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 grasses in which they most delight. The eddih is of course also worth more.

But he is not quite 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, sowing 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 swath, 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 is now preparing a second meadow, lying at the foot of the one just improved, for a similar process of improvement.

In cafes where pasture-land can be spared for mowing, Mr. Salter 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 dabbles the feed upon the unbroken surface, after feeding it down as close as he can with sheep or other flock.

It 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 fillings per acre to a tenant, than, in its former state, it was eight fillings the acre. It is

**Deduct and Creator Accounts of Mr. Rix's Meadow, ending at Michaelmas.**

**1806.**

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th></th>
<th>d.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>461 of open drains, at 91/2d.</td>
<td>14</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>173 under drains, at 6d.</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>700 elder faggots, laid in drains</td>
<td>5</td>
<td>12</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Filling and spreading 1000 loads of mould, at 251 per hundred</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Seed.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>5</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 co. fp. tares</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6 bushels of grey peas</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>6 do. of oats</td>
<td>0</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>2 do. of rye-grafs</td>
<td>1</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>100 pounds of Dutch clover</td>
<td>3</td>
<td>15</td>
<td>0</td>
</tr>
</tbody>
</table>

**Horse's Time.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>5</th>
<th>0</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. bashing 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>1</th>
<th>0</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 bashing, 2 days</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>1 do. gathering flones, 2 days</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total expense** | 65 | 7 | 0

**Produce.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>72</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 loads of hay, at 4l.</td>
<td></td>
<td>72</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feed</td>
<td></td>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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 of altering and improving the nature of the herbage, to have recourse to the occasional application of manure; as by this means the flake 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 grass-farmers in the belt cultivated districts, that when lands of this sort are suffered to get much out of condition, that 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 upon 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-plants. It is chiefly, perhaps, on those accounts that old grass-lands are superior to new ones, and it explains the reason of the greater utility of early comports with dung in the latter than the former cafes. However, with respect to the most proper periods of making such applications, there is much difference of opinion; but it should, probably, be regulated by circumstances; such as the state of the land in regard to dryness, its situation, the heat of the fenon, 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 or 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, as at this period the dressing may be laid on with the greatest convenience and safety; and from the after-grasses being chiefly confused with the lead lots 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 cafes, 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 uneconomical, 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 wind, as in general is the case, there must be considerable lots of manure in the extrusion and dilatation of the inner 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 lots incurred in this way is much more considerable than is commonly supposed, as must appear evident from the great exhalation and constant evaporation that is often kept up for many days, or even weeks."
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weeks, as the very offensive smell that issues fully proves. In this district, where we have occasionally witnessed the practice, with some of the less intelligent farmers, the moilure of the manure has been so much forced off and disipated, especially when there is much wind, as to leave the materials in nearly a perfectly dry state. The fladden drying up of large ponds, at such seasons, shews in a more striking manner the extent of the injury that the farmer sustains in choosing this feaon for the application of his manure upon his grass-lands. And, it still further rates, that "there is another way in which a vast lofs of manure may take place when applied at either of the periods that have been just noticed, especially where the lands lie in floping 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 flate of solution, into the ditches and runlets on the fides or other parts of the fields. Of the great waft 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 previously dree'd, as it will be found highly coloured, and loaded with the curishing carbonaceous particles of the manure." And "after frosts, when sudden thawes occur, the fame thing happens" in a still more extensive degree than in the other fasons.

In cafes where the natural drynes and open texture of the foil admit of the manure being applied in the early spring months, there will be least danger of waft 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 grafts will soon over-shade and conceal the dung, where laid on in a suitable flate of reduction or finenes, without fuffering much exhalation to take place; and the enriching material be conveyed to the roots of the grafts-plants at the time in which it may be the most useful in promoting their growth. Where the principal object of the farmer is a large produce, and the nature of the soil will admit of the manure's being applied without injury, this is unquestionably the most fuitable as well as the most beneficial time of putting the dung upon grafts-lands. The earlier, however, it can be performed the better. See MANURE.

But it has been flated 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 othors fuppofe this laft as the molt proper feaon for having the bellines performed in of any.

In regard to the kinds of manure that are molt proper, there is hardly any fort that will not be beneficial when laid upon grafts-lands; in general, however, the more rich animal kinds will be the molt fuitable for the older forts of fward-land; and dung, in combination with fresh earthly materials, the more proper on the new lays or grafts-lands, as by this means a fine earthly bed will be prepared for the roots of the grafts-plants to shoot and spread themselves into, and a better fward formed in confequence of fuch applications. See Laying Land down to Grass.

It is the practice of the bell farmers in the hay-district of Middlefex to use the richeft dung they can procure, without mixing it with any fort of earthly material, as they find it affuer bell in the quantity of produce, which is the principal object. The lands on which this fytlem is pursued, are mostly fuch as have been long under fward, and where the foils are chiefly of the more tenacious, loamy, or clayey kinds. It cannot, however, be doubted, but that earthy comports in the proportion of a third or fourth of fuch materials may, in many cafes, according to the nature and circumstances of the land, be had recourse to with great and beneficial effects, both in rendering the land more prodcutive, and in bringing the herbage into a finer flate, as well as in bettering the furface for the purpoze of mowing. See MANURE.

It may be observed, that whatever the nature of the material may be that is employed in combination with dung, or the fort of manure that is used, it should invariably be brought into a rather fine flate. It is the practice, in the districts mentioned above, to advance over the dung that is brought from London, in a flate of tolerable rottenefs once, chopping it well down in the operation, so as to be in a middling flate of finenes when put upon the land. It is neceffary, however, that it should 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 respect to the proportion of manure made ufe of at once, it should be, in fome meafure, suited to the flate of the land, but, in general, fuch as to afford a good even covering to the furface of the ground. Where the manure is of a very good and enriching quality, the quantity may be from four or five to fix or even 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 dreeing grafts-lands, in fo far as it respects the foil, should constantly be performed at fuch dilfiances of time, as that the fertility of the lands may not be fuffered to decline, but be preferred in an equal or increased flate of heart; in which the manner and frequency of cutting, or otherwife consuming the produce, muft be confidered; as, where crops are more frequently taken off, the land muft be prevented from being injured, by the great lofs of fertility that muft arise in this way, by the dreesings being applied at shorter intervals, or in larger quantities at a time; but the firft is by much the bell method, as injury may often be done by too great a dreeing 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 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 a too common practice, in districts where grafts-husbandry 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 raising of full crops of grafts for being converted into hay, and of proper kinds of green food, that a full flock of cattle can be kept, and the largofe proportion of manure provided for the land. It may be noted there are a few articles made ufe of as top-dreeings to grafts-lands, which cannot, it is faid, be frequently repeated with either safety or advantage, fuch as chalk, marle, chopped woollen rags, and fome others. It is flated, that "the flirt of thefe kinds, epecially when of a loft, vinctuous nature, fo as to readily fall down in the flate of solution to the roots of the grafts-plants, is found to produce the molt beneficial effects, in rendering the lands more fertile and productive, and improving the quality of the herbage. It cannot, however, be often repeated in its simple flate of advantage, as it is fome time in producing its full effects; but in that of compofed, it may be applied with fuccefs at shorter intervals. Marle is like- wise a fulblance, epecially when it is of the rich, foapy kind,
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kind, that may be made use of with much advantage as a top-dressing on grass-lands; but as its operation is flow, it cannot be repeated at short intervals, except when employed in the late of a compost with dung-woollen rags, which, rendered small by being chopped into pieces, may be laid on land in the late of sward; but as they require a considerable length of time to sink down and become mixed with the soil, 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 they 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 fuel-ashes, coal-ashes, coal, coal, and foot. Most of these have been made use of with good effects when thinly spread out over the surface of lands in the late of grass. The three last have been found to produce the best effects in being diffused over the new laws 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 he trust to the mere appearance of the effect soon after the manuring; for some of them, particularly foot and malt-dirt, will dwell 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 one or two acres, for instance. At hay-time, the crops should be weighed. It will then be known which manure, at the given prices, suits the soil 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 kinds 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 a regular or so exact a manner. Besides, when the heaps are set out too large, much injury is done to the grass-plants on the surface where they lie, if not soon 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.

Same case 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 flovel. 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 round 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 be suffered to remain so long, as is often the case, before they are spread out, as the plants underneath them become blended and tender, and great injury is done to the sward in such cases, 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-fields will not be formed, and, of course, the disadvantage of 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 bullock barrow 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 claggy, adhe:ire 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 feed. 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 fap in all plants ascends through the albuminous 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 nutrition, and the plants in consequence become 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 our having been found that the grasses are more early and abundant in different cases, where the after-grass is not fed down much in the autumnal season with live stock. See Mowing and Grassing.

Comparative 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 the writer, is the
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commonly denominated Price. But these inquiries suggested a further idea concerning the part of the produce, of either grass or arable land, to which that circumstance is attached. It is evident, on the lightest view of the subject, that the portion of the produce consumed in the farmer's family can have little to do with the price of the market; it never finds its way thither; it never comes to be measured with the demand of the consumer, who does not produce. For this reason, in all inquiries that have for their object what is called plenty or scarcity, we never hear of any thing but price; and price is never formed but by the supply of towns from the produce of the country. The larger part of a modern society consists of the inhabitants of those towns, who are supported either by manufactures, or on incomes not derived immediately from the cultivation of the earth. So much for just opening our way in a field rather interjacent: but may we not, with equal propriety, extend the circumstance just alluded to, to the labouring families supported by the farmer? His little neighbours in the village who do the work of his husbandry, arrest, if we may so express it, the amount of their subsistence from the crop before it arrives at the market. They must be fed; and though in many cases, by buying their flour of a miller, they seem to close with the inhabitants of a town, yet, perhaps, in more numerous cases they are, in fact, fed immediately from the farmer's stores; and in effect always so: for, if the farmer cannot produce his crops but by their direct affiance, and must multiply them exactly in proportion to the operatives of his culture, they cannot be considered in any other light, than mouths attached to the culture of the land, and demanding a deduction from the produce of wheat, before the surplus or market be reckoned, in as direct a deduction as that from his crop of oats for the food of his horses, or other animals. It is added that there are in the Suffolk Report some estimates of what the writer calls produce free in the market, and he makes the grafs-lands yield a greater free produce (horses, labour, &c. &c. deducted) than arable; and he knows not but it may be the same in other counties. Other writers seem also to have had the notion that grafs-land is more beneficial than arable. Bertrand, a Swizer writer, says, that grafs-lands yield more food than arable, and therefore manufacturers should be fixed in them. Hartlib seems to be of the same opinion, and quotes those of Europe as the most populous. Fortrey, who wrote in 1663, also says, that our chief care should be to increase our flock of cattle. There is some degree of truth in these sentiments; and they might be considered in relation to the proportionate nourishment, in a pound of animal food compared with that of a pound of vegetable, which some authors have made vastly greater in meat than in bread. These are topics, it is stated, which ought to be thoroughly examined, that the public mind may be free from every erroneous bias upon such points. But further in the dairy countries, where butter is the chief produce, four firkins, or 224 lbs. may be reckoned the average produce per cow; the calf sold at about 8 weeks old, may contain about 30 lbs. of flesh; and as the pigs supported by a dairy, used to be reckoned at the rate of 20s. per cow, when pork was 6d. per pound, it implies, that 40 lbs. of pork is the proportion to each cow: but the cow consuming the produce of three acres, the acreable account would of course land as below:

\[
\text{Acreable Account.} \\
\begin{array}{l|l}
\text{In Butter} & 74 \\
\text{Veal} & 10 \\
\text{Pork} & 13 \\
\hline
\text{Total} & 97
\end{array}
\]

However, in the chief counties, the produce vary a good deal: in Cheshire 4 cwt. per cow; in Shropshire 3 cwt.; in Gloucestershire about 2½ cwt.; in Wiltshire 4 cwt.; in Somerset 3½ cwt.; in Warwickshire 3 cwt.: the average of all these is 5½ 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 butts, veal may be called 1½ lbs. and pork 2½ lbs. in all 4½ lbs. 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 40s. rent, will give 200 lbs. of mutton. By an experiment made on land of 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 marlshes, goes even further than this ratio or proportion to the acre.

With respect to the butter dairies, they are on land of about 1½ acres per cow; and in the produce he 97 lbs. the proportion will be 6½ in every shilling rent. The cheese dairies, at 25s. rent, yielding 147 lbs. are also at about 6½ shillings. The meat is 5½ shillings. It is easy 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 disentangle 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.**

1. Turnips; eight sheep an acre, at the increase of 5½ each sheep, or 40s.; in mutton 60 lbs. and for 5 acres 200 lbs. will be sufficient (in 1 lb. per person per diem) for two persons, one year and five weeks — — 2. Barley and oats; suppose an allowance of 1½ acres of oats (at five quarters per acre) for one horse as the proportionate team to twenty acres, and including feeds for 1½ acre: in all sixty bushels; remain 3¾ acres for barley, at four quarters an acre; fourteen quarters or 112 bushels; deduct fourteen for feed, remain ninety-eight bushels for milt, &c.; but, if applied in bread, sufficient at nine bushels per head per annum, for eleven persons a year, minus one bushel.

3. Clover; deduct two acres for the summer and winter food of the horses, remain three acres for sheep, at eight per acre, improved 8s. each, or 32 4s.; or (at 6d. per pound) 10 lbs. of mutton, and for three acres 36 4s. full-
GRASS.

Time.

- 2 1 20

4. Wheat; twenty-two bushels per acre, which, after deducting feed, leave twenty, or 2½ quarters, and for five acres 12½ quarters, sufficient for twelve persons a year and two weeks.

Whole produce in human food - 16 1 17

The same land, if in grass, would give 80lbs. of mutton per acre, 400lbs. per annum, and for four years 1600lbs. sufficient at ½lb. 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; supposing 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 sorts of labour at 2½, an acre, we shall, he supposes not be far from the fact; the pay of a labourer may be reckoned on an average at 2½ 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 £1. a head: for every £1 therefore that the farmer pays in labour, we may safely, he supposes, 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 mistaken estimate being 2½ he calls four persons', and the farmer's family one, making five, to be deducted from the acreable amount of the farm."

Brought forward - - - 16 1 17
Deduct - - - 5 0 0

Remains for market - - - 11 1 17

And the 22½, excess in the 21½,
strikes off - - - 0 0 17

Yet, "in regard to grass land, as it is managed with so much more ease, and farms are generally so much larger, it will be fair to deduct only one person for farmer and labour."

Brought forward - - - 8 1 36
Deduct - - - 1 1 36

Remain for market - - - 7 1 36

"It then appears, that under the circumstances of such land thus applied, arable land, on comparison with grass, sends to market in the proportion of 11 to 7½. But if the barley, instead of being drunk, be eaten in bread, it adds to the arable account eleven persons, and the account would then stand nearly twenty-two to 7½, or about three to one.

But, as the largest part of the kingdom is employed in fylfens of husbandry very inferior to this excellent one, let us calculate how the comparison will stand with open fields, and those inclosures which are managed by means of fallows in the ordinary rotation of cropping that is pursued upon them.

"No. II. Open-field arable—Soil clay or stiff—Rent 10s. 6d. per acre, five acres each Crop; thirty in all, in a Course of Six Years' Husbandry.

1. Fallow:

2. Wheat; produce twenty-two bushels; feed two; for consumption two, or 2½ quarters; 12½ quarters for five acres, being food for twelve persons during one year and two weeks.

3. Oats; produce four quarters an acre; feed half a quarter; remain 3½ quarters per acre, or 17½ quarters, or 140 bushels; sufficient, at twenty-five bushels a head, to feed five persons a year and five weeks, if used in bread.

4. Fallow:

5. Barley; supposed to be consumed in beer, &c.: but, if eaten by man, at four quarters an acre, deducting half a quarter for feed, remain 3½ quarters or twenty-eight bushels; and at nine bushels a head, sufficient for three persons one year, and one bushel over, and five acres, enough for fifteen persons one year and two weeks.

6. Beans; for horses equal to the food of 1½ horse (at one horse to twenty acres) for the year.

Brought forward - - - 12 1 2
Deduct labour and farmer - - - 6 1 0

Remain for market - - - 6 1 2

The grass - - - 16½ 0 0
Deduct 1½ for farmer and labour, that is, one per 20 acres - 1½ 0 0

Remain for market - - - 2 15 0 0

But
But if the barley and oats be brought into the account as human food, the account will then stand in this way.

Wheat - - - - - - 12 1 2
Oats - - - - - - 5 1 5
Barley - - - - - - 15 1 2

Deduct for farmer and labour - 32 2 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-fix to fifteen.

"No. III. Poor Sand or Heath—Rent 5s. five Acres each Crop; thirty Acres in all.

1. Turnips: four sheep an acre, to the increace of 6s. each, or 2½; in mutton 48lbs.; and for five acres 250lbs.; sufficient, at 4d. per diem, for one person one year sixteen weeks and four days - 1 1 16 4

2. Barley and oats; one horse to thirty acres, which demands 2½ acres of oats, at three quarters (feed deducted); the remainder therefore 23 acres for barley, at 2½ quarters per acre, being sixteen bushels (feed deducted), and for 2½ acres forty bushels remain for malt; but enough in bread, at nine bushels a head for 4½ perfons a year, minus one

4. Ditto.
5. Ditto.

The whole, without any horse account, would need, 1½ years, three sheep per acre, 26 weeks 2d. two ditto ditto 3d. one ditto ditto the improvement (or the value in keeping) of 40s., and for five acres in each to 10/-; hence it appears that to keep one horse would almost equal the whole amount.

6. Rye: 1¼ quarter; twelve bushels; feed deducted, ten; sufficient to support one person fifteen months; and for five acres fix perfons one year and eight weeks - - - - - 6 1 8 0

Within a small fraction equal to The fame land in heath would feed, but not fatten, to the value of 10/- per acre; call this 20lbs. of mutton; 10lbs. for five acres, and 600lbs. in fix years; sufficient, at ½lb. Perons. Weeks. Days.

Brought forward, arable account - 8 1 0
Deduct, as farms on this soil are large, only half a perfon for thirty acres for the farmer; and reckoning labour at 8s. an acre, it is 12s. for thirty acres, or 2½ perfons; in all three - 3 1 0

Remain for market - - - 5 1 0
Gras for ditto - - - - - - 3 1 5

But "a fraction is to be deducted for farmer and shepherd. The difference, therefore, is as five to three. But if the barley be consumed in bread, the account will be,

Brought down - - - - - - 5 1 0
Barley - - - - - - 4½ 1 0
Together 9½ 1 0
Gras - - - - - - 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 requesting them to be read with candour. He presumes to offer them but 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 former; 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 interest of the public demand every possible encouragement to tillage to 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 first to keep much in grass, and the latter to plough all they can; with short leas, 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 neat 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
very few arguments to convince a landlord, that in cold wet
lands especially, the leas ploughed land you have, the leas
you put it in a tenant’s power to ruin your estate. That a
tenant of 60l. per annum in a dairy-farm will get money,
while a corn-farm will harve its occupier (though, perhaps,
the former gives 15s. an acre for his land, and the other but
10s.), is self-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 re-
spect to profit, than the superior punctuality of the dairy-
farmer in the payment of his rent. He never met with the
flew of old being devoted partly to corn and partly to
dairy-farms, who controverted this statement.

Clay.—Upon “this soil, when tenacious 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
farm, and whatever cattle may be kept for consuming straw
and making dung, must depend in a larger measure on mea-
dow hay, than upon foils which admit turnip, cabbage, &c.
Clover will do on clay, but it is more hazardous and liable
to failure; in which case, without a certain resource in
the hay of natural grass, the farmer would often find great
inconveniences. He has examined many farms with this ob-
ject in view, and found that, when half the land has been
grass, they have been more profitably conducted than with
a leas proportion; but on no account with less than one-
third.”

Loam.—It is stated that “one-third or one-fourth in grazs
is a proportion found suitable to various loams; the more
they tend to waterf, the larger the portion. It is not,
however, essential on these foils, not only because clover and
other artificial grasses be leas 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 farms are of so
happy a texture, that they do very well in permanent grazs,
and without burning in light droughts; but, in general, it
may be observed, that sand in its several varieties is, of all
other foils, that which pays best in tillage: it is easily
worked; expenses 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 relieved sufficiently, for ensuring a perpetual produc-
tion of corn. But, contrary to this maxim, and most un-
profitably, large tracts are commonly tied up from the
plough, by covenants of leases, under the name of sheep-
walk, heath, &c., which would, by alternate tillage and
rest, produce more corn, and keep more sheep, than in the
present state; this is particularly the case in Norfolk, Suff-
olk, Nottinghamshire, and some other counties.”

Chalk and Lias-foils Soil.—“Nearly the same observations
are to be made on this clays: they are more productive under
the plough than in grass. But landlords tie up their tenants
from ploughing downs 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
cow leases, which, in many cases, ought not to be touched;
and fine sweet 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 de-

erived on this soil from faint, one of the most useful grasses
that we owe to the bounty of Providence, but attainable
only by tillage.”

Past.—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, very bottoms are found every where. They admit and
call for a much greater improvement than any other soil,
comprehending the larger part of the wild lands of the
kingdom. These soils are very rarely brought into the
plow they are capable of, without tillage, and con-
sequently, to prohibit it, is to pass a decree of perpetual
fertility. The obblige, 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 moins than to till-
ages, not however without numerous exceptions, as we see by
the general practice in the fens of Cambridgeshire and Lin-
colishire. The alternate husbandry does well upon them: it
is easy, 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 pro-
portion 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 com-
mon to see entire farms of grazs-land, and the tenant pro-
bibited from breaking up an acre; in such cases there is a mo-
tive for ploughing not immediately connected with soil.
To till a part would be right, whatever the soil may be; turn,
in such a country, is not to be bought, and the con-
venience and profit of having some is no inconsiderable ob-
ject; it would be carefully used as litter, and the manure
arrived would improve a portion of the land. Some cab-
ages, 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), so as to
outweigh large expenses in procuring them on foils not quite
adapted to their culture. There is not a question but a
farmer in such cases could afford to pay more and ferility
to plough a portion of his land than under the present
covalents. This would, it is supposed, extend the fourth
farms in soil rather unfavourable to the plough; and
to a larger proportion in others. But even three or four small
fields, though no more than one-fifth, one-sixth, or one-
third, 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 grazs, as many are in
Wiltshire, Gloucestershire, and other counties, this remark
is yet more applicable, as the produce of tillage, straw,
cabbage, &c., is yet more necessary than in a more fattening
farming. In this case, and indeed in most others, the quan-
tity might be partly regulated by the team: 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 ac-
ternative that quantity. If the various works be examined care-
fully, it will be found, that a horse to twenty acres of til-
lage 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 lands, &c. or
with rotations of crops, in which the foil retts for several
years; on such the proportion varies: but merely on grazs-

dfarms, where some horses must be kept, and are at present
unem-
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 districts, being highly improved, demand very little attention, it is supposed. See Tillage, Rotation of Crops, and Pasture.

Grass Loaf, in Agriculture, a term frequently applied to such fward 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 seeds of grasses that are employed in laying down land to the state 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 seeds 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-fod, in Rural Economy, a name applied to such fods or turfs as are pared off from the surface of old fwardlands, 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 small plot of fine even turf. In the former intentions they are generally pared off by ploughs, or spades, continued for the purpose; but in the latter almost constantly with great regularity and exactness, by a turf spade for the purpose. A tool of the plowman 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 expedient manner. It can also be had recourse to with great advantage in paring the fwards off old grass lands, waffle, and commons, previously to their being burnt and brought into the state of tillage-husbandry. 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 fimple buffets 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, lunt, and other works of a similar kind. It would seem, consequently, to be a very useful tool in the extensive buffets of constructing embankments against the sea, or other large waters.

The inventor was led to the construction of this plough, in consequence of the want of a more cheap and expeditious method of performing the work than the usual one of the spade, in cutting turfs for forming grass-plots, &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 represented in the figure, the kind or operative parts being simply shewn. 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 shewn by A, A, is the beam, serve, as in the common ploughs, 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 a 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 side cut, preparatory to the separation of the turf or sod. The cutting-iron D may, by means of the levers G, G, be raised or lowered at discretion. And, in order to keep it in its place properly, the two supports at H, are made, and provided with several holes for the purpose of J, formed in the cutting-iron D. The two handles are displayed at K, K, and the frame at L, L, L, with the whole of the remainder, which in the frame is marked black, is to be formed of iron.

A certain degree of practical experience is necessary, in order to use this plough, so as 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 its immaturation. In a very short time, he will, however, be so 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 sod at a proper depth, and executes the work, as soon as the draught commences, in the team. In the performance of the work, oxen are recommended as preferable to horses, from their drawing more readily, and being more readily managed on soft lands; but we apprehend that this will not, in general, be found to hold good, and horse-teams are far more expeditious. 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 stratified minerals, when they come to the surface, are said to be babbet, crop, burl-out, go-out, to want-cover, to run-out, to out-burlout, 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 40 miles; then N.E. 40 miles, and is lost in the river St. Lawrence, N. lat. 45° 12'. W. long. 74° 48'. It is a rapid river, affords many mill-fects, and near the mouth, its banks produce great quantities of hay.

Grasse, a town of France, and principal place of a district, in the department of the Var. The place contains 12,521, and the canton 15,554 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, 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 45,294 inhabitants, on a territory of 292½ kilometres, in 18 communes. N. lat. 43° 5'. E. long. 2° 42'.

Grasses, Petrified. Mr. Whitehurst, in his "Inquiry concerning the Earth," 1st edit. 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 floras, says, "Outlines," p. 85, that
GRA

that the gramina of these argillaceous strata are of unknown species in the recent state, and appear rather allied to the cases and reeds of the Indies, than to grasses properly so called. Mr. Farey alio, in his laborious researches among these carboniferous strata, has seen nothing resembling grasses 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 grasses, probably belonging to many of the recent species, at considerable depths below the surface of, or even at the bottom of the peat, or mucky deposits; but such peat foils should on all occasions be distinguished carefully from stratified, or real fossil remains, as remarked in our article COAL.

GRASSHOPPER, in Entomology, a species of Gryllus; which see.

GRASSHOPPER, in Ornithology, a name given to the Alauda trivialis; which see.

GRASSI, CECILIA, in Biography, afterwards Mrs. Bach, who performed the first woman's part for several successive years at the opera with Guarducci and Guadagni, was inanimate on the stage, and far from beautiful in her person; but there was a truth of intuition, 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 surprized. Her performance of the part of Emiride, 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 fiscal of the domains of the states of Holland, and secretary of the bipartite chamber on the part of the states-general. 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 fectu imperandi jus." This was published in 1634, and in 1644 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-named works, he attempted to confute the popular maxims of Buchanan, in a treatise, entitled "De Jure Majestatis." This was dedicated to Christina, queen of Sweden, who was known to be a great affecter of regal privileges. Grafswinkel defended the liberty of the seas against a native of Genoa, in his work "Maria Liberis Vin- dices." 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 oppugner of the rights of the people. Moreci. BAYLE.

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 phyic, and afterwards became professor of the same science, and gained considerable distinction. But having embraced the Calvinistic doctrines, on the persuasion of Peter Veronelli, 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 Bile, in the hope of a better fortune, and where, in fact, he taught and practiced 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 remarkable for their talents, and evidence a large share of knowledge; but in others he shows an attachment to the absurdities of the alchimist, much superstitition, and opinions which do not imply a sound judgment. Eloy. Diet. H.I.

GRATCHE, in Geography, a town of Russia, in the country of the Coffacks; 20 miles N.W. of Tzaritszen.

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 him as his partner in the throne Valentinian II. the younger son of the late emperor, by his second wife Jullina. Gratian, though hurt at this infringement 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 is praised for these deeds, he has not escaped blame, and a high degree of censure, for putting to death the renowned general Theodorus, 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 at Tarse, 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 haughty displeasure, and placed him at the head of a separate army, with which he was enabled to destroy a large body of Sarmatians, 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 lifted some edicts relative to the excrements of religion. As Valens had left no male heirs, 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 was highly applauded for almost all the amiable qualities which have decorated the best 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 fancies of unmanly pleasures, spent much of his time in indulgence 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 favourite sons 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 diversions were on the very point of embodying themselves into a serious 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 the even were 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 household troops. He had 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 duped emperor into the hands of the commander, who caused him to be put to death, as he rofe 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 Chiuffi, 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 syllables of ecclesiastical policy. Gratian undertook the task of compiling such a syllable, 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 stamp 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 depositions, and to extend the authority of the Roman pontiffs, it was for centuries appealed to as the standard of ecclesiastical law, and even in ages succeeding 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 1472, when it was printed at Mentz: this edition was followed by impressions at Venice in 1476, and Paris in 1458. Another edition was printed at Rome under the auspices of pope Gregory XIII., in four vol. fol., on which a large portion of labour was bestowed in correcting its numerous imperfections. Anthony Angullin, archbishop of Tarragona, in Spain, published a valuable treatise “De Emendatione Gratiani,” of which the best edition is that published at Paris in 1672. Moreri.

GRATICULATION, a term some writers use for the dividing a draught or design into squares, in order to the reducing it thereby.

GRATINGS, in a ships, are small ledges of sawed plank, framed one into another like a lattice or prifon 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 botanists 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 medicinae, so famous at present as a cure for the gout, but this opinion, it seems, is contradicted by the proprietor of the secret.—Lim. Gen. 13. Schemb. 17. Wildfl Sp. Pl. v. 1. 102. Valfl Enum. v. 1. 88. Mart. Mill Dict. v. 2. Atl. Hort. Kew ed. 2. v. 1. 42. Brown. Nov. Holl. v. 1. 435. Jull. 121. Lacharme. Illust. t. 16. Gartn. t. 53?—Clas and order, Dianthia Monogynia. Nat. Ord. Perifonant, Lim. Scrofulariae, Avl.

Gen. Ch. Gen. Perianth 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 shortest and barren, the two uppermost attached to the tube of the corolla; anthers roundish. Pest. Germ. inferior, conical, style straight, awl-shaped; stigma with two lips, closed after impregnation. Peri. Capsule ovate, pointed, of two cells and four valves, the partition from the inflated margins at two opposite sides. Seeds numerous, small. Eif. Ch. Corolla irregular, reverted. Two flamens barren. Capsule superior, of two cells and four valves. Calyx in five deep segments. Stigma with two lips.

Limneus gratiola, in the first edition of Sp. Pl. 17, chiefly depended on the original and primary species, the officinalis, for of the three others there defined, dulcis is Careen gratiola of the second edition, and Limntria pyxidea of his Mantilla 253; virginiana, though in his possession, was made a Gratiola chiefly on Gronovius’s authority; and postrema, though a genuine Gratiola, had then probably never been seen by Limneus at all, but was adopted from Pecklits. In the second edition G. Montaniss takes place of the dulcis, and a wrong East Indian synonym is annexed to virginiana, but no further species are added. In the second Mantilla two new ones are described, rotundifolia and hypodoris, both from the East Indies, so that six species in all are enumerated in Syll. Veg. ed. 14. To this Wildenow has added eight more, chiefly East Indian, prudently declining to adopt three unconfined ones from winter’s Flora Carolina. Valh has far outflapped his predecessors, giving 31 species in all. Unfortunately a great share of these were derived from dried specimens, 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 entirely
entirely new species from New Holland. We shall confine
ourselves to an account of such as are certain, with
compendious remarks on a few of the rest.
t. 106.)—Leaves ovate-lanceolate, ferrated, five-ribbed,
smooth, somewhat longer than the flower-flasks.—Native
of moist places in Denmark, Germany, Switzerland, France,
and Greece, flowering in June. The roots are perennial,
rather creeping. Whole herb smooth. Stems annual, 
ascending or erect, twelve to eighteen inches high, leafy,
round, pale and very fleck, generally simple. Leaves nu-
merous, opposite, sessile, dotted, above an inch long, ovato-
lanceolate, bluish, with many shallow tooth-like serratures
in the upper part, and five, rarely seven, parallel ribs, of
which the middle one is the most considerable. Stipulas
none. Flowers pale blue, with an orange tube, inodorous,
fearfully an inch long, on simple, solitary, axillary fls.,
which are generally about half the length of the leaves,
more often, and bear a pair of bracts 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 pungent
virtues, whence the French call it Poor-man's herb, on
account of its cheapness and efficacy. Indeed its use re-
dquires great caution, and a plentiful administration of warm
water, butter, or oil, at the same time. A scruple of the
dried herb is mentioned as a sufficient dose, but its uncer-
tainty, and its emetic properties, have justly brought this
medicine into disfavour; these being to many more unexpec-
tioned drugs for the same purpose. Its flavour is na-
fusive and intensely bitter.
(G. peruviana; Walt. Carol. 62.)—Leaves ovate, crenate,
airy as well as the stem. Flowers axillary, nearly sessile.
Native of moist places in South Carolina, flowering in May.
Stems 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 base, blunt,
with two or three diffused teeth on each side, fringed, dotted,
and hairy. Flowers nearly sessile, white, with a pair of
spreading bracts, which are fringed like the calyx.
albo; Feuill. Peruv. v. 3 23 t. 16.)—Leaves ovate-oblong,
toothed, downy, obscurely five-ribbed. Flowers axillary,
sessile.—Native of Peru, Mexico, and the Brazils. The
whole herb is more or less downy. Stem a span high,
angular, more or less simple. Leaves oblong, somewhat
ovate, various in breadth, bluntish, obscurely five-ribbed,
the margin furnished with diffused teeth. Flowers white, near
or quite white, shorter than the leaves, with a pair of brac-
tas very like, and about equal to the calyx, strongly coun-
tenancing the idea of their being properly calyx-leaves.
Native of the neighbourhood of Port Jackson, New South
Wales, and of Van Diemen's land.
 Vanessa lanceolate, toothed. Flowers nearly sessile."—
Native of Port Jackson, the south coast of New Holland,
and Van Diemen's land.
5. G. pudica. Brown n. 3. "Clothed with pow-
dery down. Leaves lanceolate, toothed in their forepart,
scarcely longer than the flower-flask."—Native of Port
Jackson.
Mr. Brown announces the eXistence of a few unpublished
species, natives of North America, of which we know
nothing further. He mentions the Linnaean G. hypoglossa
and rotundifolia as species of Linderaea with two barren
flavem, undoubtedly a variable circumstance in this tribe,
and constituting no generic distinction. G. Monacoica is
Herbs, and has the appearance of a good genus.
With respect to some other species.
G. infusa. Vahl. n. 4 (Digitalis lutea Hoitaniae prop.
tis; Tourn. Infl. 165.)—Stems linear, entire. Flower-
flasks axillary, the length of the leaves. —Native of Por-
ugal. This seems 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. Lobeloides of Retzius, Vahl. n. 16, has neither the
habit, calyx, nor bractae of this genus.
G. infusa. Willd. n. 9, seems to agree in all these points
with Mr. Brown's Linumphila, the Hottonia indica of Lin-
nus.
G. incisa. Vahl. n. 17. (Capparia crassia Var. Leuzei,
sp. Hage) is the species, a genus Linn. of which not
much understood.
Gratiola Officinalis, Helen-Hyssop, in the Materia Me-
dica, is a plant to which various medical virtues have been
attributed. 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 Mathiolus. It has a strong
bitter nauseous taste, with but little or no odour; and its
virtues are extracted more perfectly by aqeous than by
spirits menstrua. It resembles digitalis both in the
shape of its flowers, and in its medicinal effects, and hence
has been called Digitalis minima. It is certainly a powerful
and active cathartic, and operates so violently as generally
to induce vomiting; and on this account, Chomel thought
it to be a medicine adapted only to the more vigorous and
robust constitutions. 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 increafe of its dose. This plant has been common-
lly used in hydropeptic cases; and in moderate doses it is said
not only to act as a hydropeptic, but also to manifest a diuretic
character, and influences of its good effects in affections
and anasarca are related by many respectable practical
writers. Geijer and Beggins found a scrub 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 fem-
ules, a dram, and even more. The extract is said to be
more efficacious than the plant itself, and exhibited in the
doze of half a dram or a dram in dysenteries, produces the
bile effects. Kolrzwiki informs us, that in the hospitals
at Vienna, three invalids patients were perfectly re-
covered by its use; and in the most confirmed cases of huns
wenes, it effected a compleat cure. It usually acted by
increasing the urinary, cutaneous, or faeculent discharges.
GRATITUDE, in Ethics, a virtue disposing the mind
inwardly to an inward sense and outward acknowledgment of bene-
fits.

Vol. XVI.
GRATIUS, in Biography, a Roman poet, surname
from the place of his birth Faunus, was a contemporary
of Virgil. They are both mentioned by Ovid in a single ditich.
The work by which this author is known, and which
he claims a short notice, is entitled "Cynegeticum," or the Art
of hunting with Dogs. It was entirely unknown to the moderns
until it was brought to light by Paul Mantius in 1534.
This learned editor printed it from a MS. copy
brought by Sannazzaro from France. It is said to be written
with a purity not unworthy of the Augustan age. The
best edition is that of Leipzic 1659, 4to, with notes. It
has been printed in the collection of "Rei Veneticae Scrip-
tores," 1728, and in Mattaire's "Corpus Poetarum." Gen.
Biog.

GRATTAN, in Agriculture, a term applied provincially
in some situations to such arable lands as are managed under
a commonable fite. But in other places, as in Cornwall,
it is employed to signify the mowing of grasfs the first year,
after the ground has been manured with fce fand; which is
an operation that they denominate mowing in grattan. The
flubles of common fields are also frequently called
grattans.

GRATZ, or Graz, in Geography, a town of the duchy
of Stiria, on the river Muehr; containing several churches
and convents, an arsenal, a caflle on a rock, and an university
founded in 1585. In this town is held the assembly of the
states; and in 1784, it was erected into an archbifhopric
on the suppfession 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° 16'. E. long. 15° 16'.--Also, a town of Silicia,
called also Hadrazi, in the principality of Troppau, fittuated
on the Mora; four miles S. of Troppau. N. lat. 49° 47'.
E. long. 17° 50'.

GRATZEN, a town of Bohemia, in the circle of Bechin;
37 miles S.S.E. of Bechin. N. lat. 48° 47'. E. long. 14°
48'.

GRAVA SELLE, a town of Naples, in the Basilicata; 15
miles E. of Venus.

GRAVATTEN, a town of Prufia, on the Curifh
Nerung; 20 miles S. of Memel.

GRAUDENTZ, a town of Prufia, in the palatinate
of Culm, on an ifland near the Vitula; anciently called Grodek;
14 miles N.E. of Culm. N. lat. 53° 28'. E. long. 18° 28'.

GRAVE, in Grammar, a fpecies of accent oppofite to
acute. The grave accent is fexpressed thus ('); and fhews
that the voice is to be defreffed, and the fyllable over which it
is placed pronounced in a low, deep tone.

Grave, in Music, is applied to a found which is in a low
or deep tone.
The thicker the chord or flring, the more grave the tone
or note, and the smaller the accent.

Notes are fpuppofed to be the more grave, in proportion
as the vibrations of the chord are less quick. See Gra-
vity, in Music.

Grave is also an ingredient in the composition of divers
terms in history and policy. Thus we fay land-grave, barg-
grave, marg-grave, pal-grave, &c.

The word, in this fense, is formed of the German gräf,
signifying comes, count; called in the barbarous Latin gravio
and argio.

Grave is alfo used for a tomb, wherein a perfon defcend
is interred.

Grave, Ital. (pronounced gra'veo) an adverb applied
to flrow movements in the fecund degree, more quick than
adagio; and more flow than large. In adagio movements,
the time is usually counted by quavers, in grave, by
crotchets. Grave, Ital. and graveinen, French, not only im-
ply a flrow time, but a certain gravity in the execution.

Grave, in Geography, a town of Bohemia
belonging to Holland, fittuated in a marshy country, on the
S. fide of the Meufe; 34 miles S.E. of Utrecht. N. lat.
51° 46'. E. long. 5° 41'.

Grave Creek, a creek on the Ohio in Virginia, 12 miles
from Wheeling. N. lat. 39° 46'. W. long. 80° 57'. Near
this creek is a mound of earth, evidently the work of art,
called an Indiangrave. Although no tradition remains,
that the Indians buried their dead in this manner, these
mounds, on examination, have been found to contain a
chalky fubflance, fuppofed to be bones of the human
kind.

Grave Harmonie, in Music, is a phenomenon thus de-
scribed by the late Dr. Robinfon: "The reinfemements
of found, which are called beats, are notes. If any note
whatever be repeated with fufficient frequency, at equal
intervals, it becomes a musical note of a certain determinate
pitch. If it recurs 60 times in a fecoud, it becomes the note
C-fus, or the double octave below the middle C of our harp-
fchords, or the note of an open pipe eight feet long.
Now there is a fimilar (we may call it the very fame) reinfem-
ent of found in every concord. Where the pulse of one
found of the concord beats the pulse of the other, the two
found are more uniformly fpread; but where they coincide,
or almost coincide, the condensation of one undulation com-
biners with that of the other; there comes on the ear a
ftronger condensation, and a louder found. 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
A are founded together; there is this noise at every third
pulse of C, and every fifth pulse of A; that is, 80 times
in a fecoud. This should produce a note which is a 12th
pulse of C and a 17th below A; that is, the double octave
below f, which makes 320 vibrations in a fecoud. That is
to fay, along with the two notes C and A of the concord,
and the compound found which we call the concord of the
Vth, we fhould hear a third note F in the bass. Now
this is known to be a fact, and it is the grave harmonie
observed by Rameau and Tartini about the year 1754,
and verified by all musicians fince that time."

Mr. John Gough gives the following account of grave
harmonie. "When two founds are heard in concert, the
vibrations producing them are arranged in cycles, no one
of which continues for a longer or fhorter time than the reft;
and their effect is perceived by the ear, which becomes
fensible of their presence. For when each cycle of a feries,
separately confidered, exceeds the twelfth part of a fecoud,
the fene of hearing recognizes each point of division made
by the coincidence of the vibrations which separate the con-
tiguous cycles; this circumiance enables the fene to con-
template these periods apart, and comprehend their origin.
On the contrary, when the duration of a cycle belonging to a
compound feries does not exceed the twelfth part of a fecoud,
the interval proves too small to be manifested by the
ear; it therefore efchews notice in a separate flate; for the
points of division recur too frequently to be eferved.
When the auditory organ finds itself in circumstances
anfwering to the preceding defcription, it has but one
method to pursfe; which is, to treat these derivative in-
tervals in the fame manner it treats all periods, which are
fingly too fmall for its comprifion; it therefore reduces
them to a fimple musical found, correffponding in pitch to
a ftring which vibtrates once in the time of each fucessive
cycle. A grave harmonie is on this account always a lower
note.
The experiments of M. Tartini, the discoverer of these sounds, extended to ten of the consonances in our table above, viz. the V, 4th, III, 6th, 3d, VI, II, II', (second minor,) 2d, (greater semitone,) and minor semitone (‡), but in all of which he seems to have mistaken an octave, in assigning the place of the harmonic in the scale, and has mentioned each of them as being higher by an octave than in our table. Mr. John Holden, the author of "An Essay toward a rational System of Music," printed at Edinburgh in 1802, p. 352, seems to have been aware of this latter circumstance, but

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<tr>
<td>VII B</td>
<td>530</td>
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<td>6</td>
<td>c</td>
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<td>3</td>
<td>VIII</td>
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<td>g</td>
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<td>g</td>
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<td>4</td>
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<td>g</td>
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<td>2</td>
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<td>f</td>
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<td>3</td>
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<td>g</td>
<td>XVII</td>
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<td>f</td>
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<td>7</td>
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<td>VIII + VII</td>
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<td>XVII</td>
<td>3</td>
<td>VIII + II</td>
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Given Consonances.

Grave Harmonics, or Implied Sounds.

18. Find the number of vibrations made in one second of time by each of the given sounds: which, supposing C sol fa ut, or c of the German tablature, or that on which the tenor cliff is placed, 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 lie above C, or the reverse if below it.

2d. Having thus obtained the vibrations of the given consonance, divide the larger number of them, by the larger term of the given consonance, and the smaller number by the smaller term, each of which, if the operation be rightly performed, will give the same result, and Iew 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 consonance, 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.

We have been thus particular in quoting from two very able writers on the subject of the grave harmonics, or Tartini founds, in order to shew the foundation of the rules which we shall here give, for determining the grave harmonic of any given perfect consonance, viz.

<table>
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<tr>
<th>Intervals below the Key or lower Note</th>
<th>Intervals below the upper Note</th>
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The experiments of M. Tartini, the discoverer of these sounds, extended to ten of the consonances in our table above, viz. the V, 4th, III, 6th, 3d, VI, II, II', (second minor,) 2d, (greater semitone,) and minor semitone (‡), but in all of which he seems to have mistaken an octave, in assigning the place of the harmonic in the scale, and has mentioned each of them as being higher by an octave than in our table. Mr. John Holden, the author of "An Essay toward a rational System of Music," printed at Edinburgh in 1802, p. 352, seems to have been aware of this latter circumstance, but

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The grave harmonics found by the rules and table above are occasioned by the coincidences of the vibrations of perfect consonances, 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 we shall here supply that defect in our article Beats, and give theorems for calculating the beats made by imperfect or tempered consonances whose 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 \( \frac{n}{m} \) (n being the leaf term, in its lowest number), and let \( b \) be the number of beats in one second of time.

Then, if the temperament be fourp, \( b = nM - mN \), the beats required.

Take for example, the 3d in our table above, and we have \( N = 240, M = 284 17, n = 5, \) and \( m = 6 \); and by the second theorem above \( 6 \times 240 - 5 \times 284 17 = 172 \) 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 easy application, in almost every instance of musical calculations.

**Grave Intervals** is a term applied by Mr. Maxwell and several other correct writers, to such consonances as are flattened or lowering by a major comma (see this article) and it is usual with them to distinguish such intervals by the grave accent thus, \( \Pi^\prime, \Pi^\prime, IV^\prime, V^\prime, VI^\prime, \) \&c.; and on the contrary, to apply the acute accent to such as are sharpened or raised a major comma, as \( \Pi^\prime, III^\prime, IV^\prime, \) \&c. and to call such acute intervals or comma redundant intervals, while those as much flattened are called comma deficient intervals, which \( \Pi^\prime, \) \&c. which Mr. Holdan, a modern writer, has recently applied this term to intervals lowered by what he calls a bearing, whose ratio is \( \frac{5}{4} = 11.94709 \Sigma + m \).

See Graveth, \&c.

**Grave fourth**, according to Mr. Holdan's system lately published, is an interval less than a perfect fourth, by what he calls a bearing (which is \( \frac{5}{4} = 13.94709 \Sigma + m \)) having the ratio of \( \frac{5}{4} = 240.02921 \pm 5 \pm 21 \) in Mr. Fary's new notation; its common logarithm is .881066, 8792, its Dr. Euler's logarithm or decimal value of the octave is .3302175, and it contains 21.80399 major commas.

**Grave proper senites**, is an interval in Mr. Holdan's System of Music, whose ratio is \( \frac{5}{4} = 43.05291 \Sigma + 4 \pm 4 \pm m \) its common logarithm is .07881071, and Euler's logarithm .0703859, and the number of major commas 3.92754 which it contains.

**GRAVEDO**, in Medicine, a Latin term, derived from gravis, heavy, signifies that species of catarrh, which is usually called a cold in the head: and in which, together with a blunting of the nostrils, and blunting of the voice, there is a feint of fullness and weight in the forehead. It is, according to Cellus, nearly synonymous with the corvus of the Greeks. See Catarrh, Cellus, de Med. lib iv. cap. 2.

**GRAVEDONA**, or GRAVIDONA, 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 flinty kind, the fizes of the particles of which vary from those of very small pebbles to cobbles, and sometimes larger. They are often intermixed with other matters, such as sand, clay, loam, flints, pebbles, iron oxers, &c. Hence there are sandy, chaly, sandy, flinty, pebbly, or ferrous gravel, &c.

Gravel, in Gardening, is a small flinty substance 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 those 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 one from, 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 chaly; it is the colour of the loam, or oxys of iron, principally, which constitutes the beauty of gravel walks; that of a deepish yellow or reddish colour being the most eligible, as when formed into well-kid 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 dufly brown hue, which may nevertheless be of a proper quality for walks where the colour is dispensable.

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 red, or so sandy, as to be clammy and slick to the feet in wet weather, or too 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 loofe, sandy, or pebbly, and which has fearely 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, calling them together, and turning them over two or three times, that they may be well blended and incorporated; 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 call it up in a heap, or long ridge, all such large rough pebbles only as roll down being cleared away: as if screened from the stones, it partakes too much of the loam, so as always to stick to the feet at every siah of rain.

In purchasing gravel for walks, it is mostly from about two to five or six shillings or more per cart-load for three horses; though the price differs greatly in different parts, and according to the nature of the gravel, as well as the goodnes of its colour.

In respect to the distribution of gravel-walks in pleasure-grounds, and gardens, 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 grazs plats 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 perpetual 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 grass.

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 grafs widely extended, and sometimes in borders for flowers and other curious plants, having either narrow verges of grafs, or edgings of dwarf box, or thift, 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 begin 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 flinty lime, brick, or other rubbish, which will greatly prevent worm-calls, and help to drain the moisture from the top of the walk in wet weather, and in winter prepare a dry surface; the proper gravel is then to be laid six 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 wide, an inch and a half of red 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 widths. At every ten or fifteen feet, as the work advances in laying, it is proper to tread, rake, and roll the gravel down, as it always rolls more firm and smooth, whilst fresh filled; it is also necessary, for fear of rain, especially in loamy gravel; for which reasons, more should never be laid in one day than can be finished off, except the rough laying. The treading should be performed regularly with the feet pretty close, taking short steps; so as to render every part equally firm, and not to sink in holes under the feet, in the work of raking and rolling. The raking should be performed regularly lengthways of the walk; and in the filling off
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 properly-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 surfaces become very foul, or over-run with small weeds or mosses, 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 mosses 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 mosses, is not eligible for general practice, or only occasionally, where any walk is exceedingly overrun; it is mostly 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 sort 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 prefer the colour. In these cases, the laying, raking, and rolling, are performed the same as in the first constructing 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 mosses; it is mostly 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 prefers the walks in good order.

Gravel, in Geology, is a term properly applied to those fabulous soils, or assemblages of worn and rounded stones, 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 loosened rocks and strata near the surface, owing to the action of air, water, and frost, &c. will be confounded with it, as too often has happened, in the descriptions of countries. The earthy 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 should, in describing such soils, all be denominated gravel, adding other words to distinguish the nature and quantity of their earthy mixtures: where rounded stones only are found, with little else among them, as on the sea beach often, 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 substituted: the last of which terms would apply to the horizontal earthy deposits or mossy soils, 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 terrestial strata; which, though they show 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 terrestial deposit, were not less distinct and marked, than are the proceedes of the precipitation of matters before mechanically mixed and suspended in a fluid, and the crystallization of substances from monftrous super-faturated 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, of 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, nay frequently, the case; but Mr. William Smith, from having devoted great part of twenty years to the accurate discrimination of strata and alluvial matters, on the principles above stated, after examining vast numbers of the deep and molt extensive wells, shafts, mines, quarries, &c. and converging with quarrymen, miners, &c. who collectively have made an almot 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 masses 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, or (natural brick-earth) or clay: and under great thickness of such doubtful masses, 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 masses, 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-stone beds, and rocks, composed of distinct grains of silex, 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 assignable, or uniform grains, which distinguish 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 coarse stone-beds, 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 so generally classed 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 flints 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 heterogeneous mixtures and uncertain and irregular stratification of the real gravel-rocks, of which there are great tracts in Nottinghamshire, Derbyshire, Leicestershire, Staffordshire, Cheshire, and others of the midland counties, in some places of immense thickness, will see abundant cause for distinguishing even the coarsest and most irregular of our grit-flint strata, from the superficial gravel-rocks above-mentioned, and, indeed, from alluvial, or water-worn mixtures of any kind. And such observers will be struck with surpries, that such a regular and constant law, as seems to have regulated the formation of grains of silex, of all the sizes mentioned, should not have been observed and referred to, for explaining the formation of coarse as well as fine grit-flones, and have guarded against our confounding them with the water-worn gravels. Accumulations of gravel are to be distinguished into native and foreign, according to the pebbles and earth and extraneous bodies among them, can be referred to known and adjacent strata, or confusions of stones and earths not elsewhere found, or but in very distant countries. For it will be found, that except on the sea shore, where the waves continually carry away, and again throw up the flakes, which fall from, or are removed out of the marine cliffs, and the current 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 case, 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 observed in the Philosophical Magazine, vol. xxxv. p. 135.

It is a remarkable fact, that all the very coarse, and irregular grit-flint 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 Derbyshire denudation, 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. 1856), 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, etc. And which fact it seems to be that Mr. Kirkman alludes to, under the name of superimposition in some of the cases mentioned pages 537, 539, 526, 307, 312, and 335, of his "Geological Essays;" it is plain, however, that these coarse grit-flones, under our coal, do not indicate the near approach of the fundamental rock of granite, as Mr. Kirkman would have us believe. We cannot close this article, without again advertin to the importance of accurately discriminating the alluvia found on different parts of every country, and of tracing their connection with the regular a'd continuous masses of strata on which they rest, 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. Fary's Report on Derbyshire.

Gravel Rock, signifies a concreted or indurated mass of sandy Gravel; (see that article), and is carefully to be distinguished from the coarse grit-flint strata, which it often closely resembles.

Gravel Pits, is a term applied to such reliquia, or extraneous fossils, as are found in a rounded or worn flate, or lodged among gravel, or alluvial mixtures, the ruins of abraded and worn strata. See our article Coal, where the distinctions between this and other classes of extraneous fossils 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 Nephritis necrosa of Sauvage; (see his Nephrologie, Ch. VII. Genus XXV. spec. 2.) and to be distinguished from the nephritis calculosa of the same nosologist, 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 fever pain in the loins, which is often accompanied by a sense of numbness, extending down the thighs of the side affected, with a retraction of the telsicle in the male, and with a stiffness of the throat, often amounting to vomiting. During the passage of the small cale by through the canal of the ureter, the dilatation and irritation occasioned by the calculus, especially if its surface should be rugged and uneven, excites those symptoms in a more or less severe degree, or for a longer or shorter duration, according to its size and form; and they suddenly cease when it has entered the bladder.

Pain is again excited in the urinary organs, when the calculus either lies over the aperture, or enters the canal of the ureter, and the pain and difficulty of passing the urine is excited. These symptoms, attending the transit of a small flute from the kidney, or its expulsion from the bladder, constitute what is usually called a fit of the gravel. The more common forms of the disease, however, consist in the formation of a sort of fleshy matter, of a red colour, which impedes the free passage of the urine, and occasions considerable pain in the attempt, as well as an aching pain in the loins, through the sympathy of the kidneys with the bladder. A whitish mucous matter is sometimes discharged with the urine, under both these forms of the disorder, 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 liberation of the small blood-vessels, and bloody urine is therefore discharged.

The little calculi, excited in those cases, are sometimes of a bright red colour, and conflat as well as the red sand which passes with the urine, or is depoited from it, of the uric or lithic acid in a concrete state.

The gravel is a disease chiefly of advanced life; it is common in guity habits, in which it often alternates with the paroxysms of gout. It has been observed, too, that it defends by hereditary transmission, like that disease; and that of the children of guity parents some have been attacked with the gravel, while others have laid the germs. It is a curious fact, also, that the concretions called chalk-flones, which are deposited in the joints in the gout, consist of the same substance as these gravelly concretions, are the uric acid. It is to be distinguished from the rheumatic affection of the joints, called rumbaria, by the galls which attends the more severe cases, the numbness of the thigh and retraction of the testicle, as well as by the mucous or bloody urine, the pain and difficulty of passing it, and the appearance of the sandy sediment in it.

Chemistry has enabled the physician to administer great relief to the sufferings occasioned by gravel. The discover, by chemical experiments, that the substance of these calculous and fabulous concretions is an acid, and therefore capable of solution in or combination with alkaline substances, led to the administration of the alkalies internally, as remedies for the disease; and, although it has not been found, that
that the larger stones of the bladder are dissolved or dimin-ished 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 fol-
vent, Mrs. Stephens' medicines, and Chittick's Receipt 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. Brande, that the absorbent earths, especially magnesia, are considerably more efficacious in relieving these 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 necessary to the bowels, a few drops of the tincture of opium may be added to it. (See Philosop.
Tranfakt. part i. for 1810.)

Of the alkalies, it would appear that the potas is, on the whole, more beneficial in these complaints than the soda: the pure or caustic potas 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 potas is not less useful, and, especially when dissolved in water saturated with carbonic acid gas, it is more agreeable, 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 a 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 the medicine. Lime-water is likewise possessed of some remedial powers, but is less efficacious than the alkaline water.

All these aequous liquids 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 diffusness which they occasion: and they may likewise operate directly, by rendering the patient unable to drink the usual quantity of water or other strong liquors. Other matters, which tend to increase the flow of urine, seem to relieve the symptoms of gravel, upon the principle of dilution; especially small doses of the nitrous ether, or spiritus etherei nitrosi, of the pharmacopœias.

When extreme pain is excited, either by the palling of a small concretion along the canal of the ureter or of the ure-
tha, opium will afford a temporary relief to the sufferings of the patient, and will perhaps aid in relaxing any spas-
motic contraction that may take place in these passages, and thus expedite the passage of the calculi. The same
objet may be promoted by the use of the warm bath, by fomentations to the loins and pubes, and by warm glycerals.

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 SYNON.:—see also NEPHRALGIA and NEPHRITIS.

GRAVELINES, in Geography, a town on the S.W. coast of the island of Negroponte, on the site of the an-
cient Eretria; 10 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. Handmade to the Arts, vol. ii p. 56.

The other end is fitted into a wooden handle.

Besides engravers, the seal-cutters, lock-smiths, gun-smiths, gold-smiths, armourers, spurners, &c. likewise made use of gravers.

GRAVEROL, Francis, in Biography, was born at Nîmes in 1635. He was educated for the profession of the law, and practiced, as an advocate, in the parliament of Toulouse, and in the prefidal 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 subjects 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 lath of cruel laws he retired to Orange, but, not thinking himself safe there, he attempted to pass 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.

In his works he followed a few particular medals and other monuments of antiquity. His "Observations on the Arreets of the Parliament of Toulouse," in 4to. were much esteemed. He was well known to all the learned in Europe, and was admitted a member of the Ricona in Padua. At his death he had in hand some other literary works.

More.

GRAVESAND, William James Esq., in Biography, was born at Bois-le-Duc in the year 1688. Having received the elements of learning at a common school, 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 practiced, when he was only eighteen years old, an excellent "Essay on Perspective," which gave him a considerable reputation among the mathematicians of the age in which he flourished. In 1707 he took his doctor's degree, quitted the university, and settled at the Hague, where he practiced at the bar, and cultivated an acquaintance with learned men. He joined some other persons in conducting a periodical work, entitled "Le Journal Littéraire," which was continued without interruption from the year 1713 to 1722.

S'Gravefand contributed to it original dissertations relating chiefly to geometry and physics. Among the discoveries most worthy of notice, and which were original pieces of his own composition, the following, "Remarks on the Conflation of Pneumatical Engines," and "An Essay on the Collision 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 king George I. on his accession to the throne of Great Britain. S'Gravefand 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.

So great were his exertions in the several duties of his office, and in preparing for publication his several works on the subject, that he incurred his constitution, and finally sunk under his labors in 1742, when he was only fifty-four years of age. His principal publications were: (1) "Philosophica Elementa Mathematica," Experiments, etc.,"Introductio ad Philosophiam Newtonianam," which contains a syllabus of algebra for the use of students, with a commentary on Newton's Universal Arithmetic; (2) "Matheseos Universalis Elementa," containing a syllabus of algebra for the use of students, with a commentary on Newton's Universal Arithmetic; (3) "Philosophic Newtoniana Institutionis," which is an abridgment of his Elements of Physics; (4) "Introductio ad Philosophiam, Metaphysicam, et Logican continent.

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'Gravefand 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.

GRAVESAND, a town of Holland, distant about four miles from the sea, six miles W.S.W. of Delft.

GRAVESEND, a town in the hundred of Tooting, in the county of Kent, England, consists of several streets, built on a declivity leading to the Thames; and is partly situated in the parish of Milton, which adjoining to that of Gravesend on the east side. The early prosperity of this town received a considerate check in the reign of Richard II., when the French and Spaniards failed the Thames in galleys, plundered 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 town a legal claim to the water-passage to London, by a grant to the abbey of St. Mary le Grace. 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 1672. The chief officer, who had before this time been called the portreeve, was by this charter constituted mayor; and in him, twelve jurats, twenty-four common councillors, a sheriff, or high reeve, 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 fire, which commenced in a barn-yard adjoining to the church, and consumed that fabric, with about 120 houses, besides outbuildings, stables, etc. 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 500L. 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.

Gravesend has been greatly improved since the year 1864, when a new town-hall, having an area beneath where the poultry market is kept, was erected by the corporation. In 1767 a new wharf, crane, and caufeway, were made, the expense of keeping which is repair is defrayed by small tolls on canage and wharriage. The rate of the tax}

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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 2483, and that of houses at 473; yet these numbers are very incorrect, and the population can scarcely amount to less than 4000, nor the number of houses be fewer than 700. Most of the inhabitants are engaged in maritime pursuits or employments. A small manufacture 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 Cleverly, 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 Gravensend; and also with vegetables; about eighty acres of ground in the two parishes being cultivated for that purpose, and for supplying the London markets with asparagus, which is remarkable for its size and fine flavour. Gravensend is situated 22 miles E. from London. Hallet's History of Kent, vol. i. 8vo. 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 480 inhabitants.

GRAVIMETER. See Hydrometer.

Gravina, Domenico da, in Biography, who flourished 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 fide which he espoused, he was stripped 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 transactions in that part of Italy during his own times, from 1330 to 1550. 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 historians.

Gravina, John Vincent, was born in 1664 at Rogiana, a village 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 passed to Rome, and lived with Paul Coard 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 codes. He arrogated to himself the merit of having devised these laws, a circumstance which involved him in a quarrel with the other members, particularly with Cretremon, the founder of the society, so that these two learned men were for several years at the head of two factions which divided the body. In 1698, he was nominated 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 criticism founded on his extensive erudition. This mode of instruction excited much public attention, but the haughtiness of his temper prevented him from being popular. By the public at large, his manners could be no obstacle to the celebrity of his writings, and his reputation daily increased. His works were numerous, and the subjects on which he treated very various. His "Origines Juris Civilis," has been ever esteemed a classical performance, lucid in its arrangements, and replete with solid and very important learning. This was first published at Leipzig in 1708, and afterwards there was a more correct edition of it in 1713; to the latter impression was subjoined a treatise "De imperio Romano," esteemed a master-piece, though not free from error. Gravina undertook to establish a poetical code, for which purpose he wrote two books, entitled "De la Region Poetica"; one entitled "Della Tragedia," and a treatise "De Instituione Poetarum." Another work was printed contrary to his inclination; this was his "Institutes of Civil and Canon Law," which he intended to have revised and given in a corrected and augmented form. In 1714, Gravina revisited his native country, where he lived about two years and then returned to Rome. He was preparing to depart for Turin, whether he had been invited by the duke of Savoy, in order that he might take the general direction of the learned institutions, when he was seized with an illness which carried him off in 1718, in the arms of his beloved pupil Metatalfo, whose poetical talents he first discovered and cherished, and whom he left heir of all his property out of Calabria. Gravina was of a contentious disposition, excessive in his praise of persons whom he esteemed, and also in his censure of those who offended him; he was arrogant, from a high opinion of his own superiority. This created him many enemies, with whom he was perpetually at war. Of his great learning there can be no doubt; but with respect to his poetical talents, it has been remarked, that he was more successful as a legist than as a practiser in the art; for his five tragedies written on the model of the ancients were not favourably received by the public, and the author's angry expostulation, proving that they ought to have been applauded as usual, was totally inefficacious. Moreri.

Gravina, in Geography, a town of Naples, in the province of Bari, the see of a bishop, suffragan of Acerra, 24 miles S. of Trani.

Gravina's Islands, a range of islands in the N. Pacific ocean, each from 20 to 50 miles in circumference, interfered with some islets, stretching N. W. to S. E. about 40 miles, between the duke of Clarence's island, and the canal of Revilla Gigedo. N. lat. 54° 52' to 55° 27'. E. long. 228° 24' to 229° 5'.

Graving, the act or art of cutting lines, figures, and other designs, on metals; more properly called engraving; which see.

Graving, in the Sea Language, is the bringing a ship a-ground, and then burning off with flint, red, or broom, all the filth and foulness that stick to her bottom without board, in order to pay her anew. See Brooming and Careening.

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 cleaned or repaired; sometimes, graving-docks are above the level of the water, and boats are dragged upon inclined planes into the same. By the fides of tidal rivers or harbours there are constructed with strong close 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, or
GRAVITATION, or is about to leave the dock at such time. See Dock, and Cナル.

GRAVISKOL, in Geography, a fortress of Russia, in the government of Koloman, on the Irilich; 240 miles S. S. W. of Kolovan. Lat. 55° 15', Long. 75° 14'.

GRAVITATORS, in Ancient Myths, was used to signify a found produced by the remission or falling of the voice. Gravitas differs from remission, as the effect from the caufe.

GRAVitas is also used to denote the state of a woman going with child. See Pregnancy.

GRAVITATION, the exerfice of gravity, or the action which a body exerts on another body by the power of gravity. It is sometimes distinguished from gravity. Thus, Maupertuis takes gravity for that force by which a body would fall to the earth suppofed at rest; and gravitation for the fame but diminished by the centrifugal force. See figure of the earth. p. 206 of Mr. Murdoch'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 dilligently 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 or 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 refpeét to the gravitating body, is properly called attraction with refpeét to the body to which the other gravitates.

The planets, both primary and secondary, and also the comet, 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, &c. hold, that bodies only gravitate when out of their natural places, and that gravitation ceases when they are restored to the fame, the intention of nature being then fulfilled. The final caufe of this faculty, as they maintain, is only to bring elementary bodies to their proper place, where they may rest. But the moderns faw, that bodies exerfice gravity even when at rest and in their proper places.

This is particularly fhewn of fluids; and it is one of the laws of hydriolaties 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 particularly 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 contemporary writers faw to have formed conjectures on this subject that did not differ very widely from the truth. From the time of Kepler it had every day become more and more evident, that some mechanical caufe had a very material influence on the laws of the planetary motions. The problems which the discoveries of that great astronomer had 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 defcribed in equal times about the centre; and what can be the caufe of that remarkable law that is found constantly to subtend 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 caufe. He fupposed the existence of a subtile 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 plauhibility, 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 eftects 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 different idea of the existence of gravitation, though he never could have been aware of its agency being fo extensive, or that it would ever be seen in fo fatisfactory a manner as it has done his own great discoveries. Gravity, he fays, in his "Commentary on Mars," is only a mutual and corporal atfection 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 plumpline 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. &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 indifficult conceptions are to be occasionally traced in different authors concerning the existence of this universal principle.

Foran, who preceded Kepler, affirmed, that the weight of a body was the sum of the tendenies 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 inverfely proportional to their maffes 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 expreffed 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, caufing them to defcribe a circle, an ellipse, or some other curve.

3. That this attraction is fo much the greater as the bodies are nearer. As to the proportion in which these forces diminish by an increaf of distance, I own I have not yet discovered it, although I have made fome experiments to this purpofe. I leave this to others who have time and knowledge fufficient 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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fixed 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 fun not in their centre
but in their focus. Therefore they are not retained by a
force proportional to the distance from the fun.

The exalted genius of Newton can suffer no diminution
by the enumeration of the above opinions, 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 causes 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 hypotheses relative to
the modification of the force with respect to the distance.
That any agency emanating from a central point should de-
crave 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, these re-
quisite data had not been exactly determined, and a slight
discordance between the result of the calculation and the
supposed fact, induced him for a time to abandon his hy-
pothesis. This circumstance has, with great propriety,
been recorded as a striking instance of the cool and dispass-
ionate frame of mind which this great philosopher prefer-
ced, 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 re-
new 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 affix 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 deter-
mine the identity of the force of terrestrial gravity, with
that which retains the moon in her orbit, is full 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
La Place.

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 be-
ginning. 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 paral-
lax that part of it which is independent of these inequalities.

This part is, according to observation, 50'-54.59, 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 \( \frac{1}{4} \). 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 masses 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 6360374 metres, from whence it may be computed the
force which solicits the moon towards the earth causes it
to fall cco010727 after one second of time. It will be shewn
hereafter, that the action of the fun diminishes the lunar
gravity \( \frac{1}{4} \)th part. The preceding height must therefore be
augmented \( \frac{1}{4} \)th part, to render it independent of the
action of the fun; it then becomes cco0312021. But in
its relative motion round the earth, the moon is solicited
by a force equal to the masses 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 pre-
ceding space must be diminished in the ratio of the masses
of the earth and the moon, to the fun, and of the masses of
the earth and moon; but this is not the case in the above,
wherein it appears that the mass of the moon is equal to \( \frac{1}{5} \) of that of the earth, multiplying therefore this space by
\( \frac{1}{5} \) we have ccc010530 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 \( \frac{3}{5} \)65764; but on this parallel
the attraction of the earth is less than the force of gravity
by \( \frac{3}{5} \) of the centrifugal force due to the motion or rotation
of the earth at the equator; and this force is \( \frac{1}{4} \)th part of
that of gravity; the preceding space must therefore be
daugmented \( \frac{1}{4} \)th part, to get the space due to the action of
terrestrial gravity alone, which on this parallel is equal to
the masses divided by the square of the terrestrial radius; we
shall therefore have \( \frac{3}{5} \)66553 for this space. At the dis-
tance 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 parallaxes, or \( \frac{3}{5} \)55/2, this will give cco0106483 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, and to reduce it to 56° 53'.

This is the parallax resulting from the theory of gravity, differing only 1/60th 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 mass 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 shewn 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 rest of the solar system. The great mathematician, above quoted, ob-serves, 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 vectors 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 vectors. 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 velocities will then be proportional to the squares of the radii of these 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 shewn, 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 subserve 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: analogy would lead us to suppose that this law, which extends from one planet to another, should subserve 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 furpulping its gravity towards it, its radius vector augment, and forms an obtuse angle with the direction of its motion. The force of gravity towards the sun, computed 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 before described; and the planet will arrive at its perihelion with its primitive velocity, and recommences a new revolution, similar to the first. Now the curvature of the ellipse at the aphelion and perihelion being the same, the radius of curvature are the same, and, consequently, the centrifugal forces of these two points are as the squares of the velocities. The forces 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 oscillatory 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 orbit, and at the same time to every distance from the sun. But to establish it in an incontestible 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 geometrician shewed, 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 this sun, and abandoned to their gravity towards its centre, they 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 seen in the second book, that the magnitude of the areas described by their radii vectors, 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 stars, 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 usually 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 sun. The comets tend also perpetually to the sun. 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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and 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 areas to the times shows us, that it is constantly directed towards the centre of the sun. The elliptic orbits of the planets shew 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 orbits. The perihelion of the terrestrial orbit would have an annual motion of 15', 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 fee 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 cau s e s 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 full 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 shewn 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 diminution 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 sun 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, whole attractive force is of the same nature as that of the sun and planets.

The sun, 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 those 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 reaction are equal and contrary; all these bodies, therefore, act on the sun, 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 consider only their mutual action; for the relative motion of the bodies of a system are not changed by giving them a common velocity: by impelling, therefore, in a contrary direction to the sun 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 sun may be considered as immovable, but the planet will be solicited towards it with a force varying reciprocally as the square of the distance, and proportional to the sum of the masses; its motion round the sun will therefore be elliptic. And we see by the same reasoning, that it would be so if the planet and sun 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 sun, if it was always exactly the same on the satellite and the planet.

Nevertheless, the action of the planet on the sun influences the length of its revolution, which is diminished as the mass of the planet is more considerable: so that the relation of the square of its periodic time, to the cube of the major axis of its orbit, depends on its mass. But since this relation is nearly the same for all the planets, their masses must evidently be very small compared with that of the sun, which is equally free for the satellites with respect to their principal planets.

This we may readily suppose from their smallness.

The attractive property of the heavenly bodies not only belongs to them in a mass, but to each of their particles. If the sun 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 sun, therefore, is the result of the gravity of all its particles, which consequentely attract the sun in proportion to their respective masses; besides, each body on the earth tends towards its centre proportionally to its mass, it acts therefore on it, and attracts it in the same 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 cause 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 sun. The satellites also, deranged in their motions round their planets by their mutual action, and that of the sun, deviate a little from these laws.

We perceive then that the particles of the heavenly bodies, united by their attraction, should form a mass nearly spherical; and that the result of their action at the surface of the body should produce all the phenomena of gravitation.

We see 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 resulting force of all their mutual actions not passing through their centres of gravity, should produce in their axes of rotation sinusoidal motions to those discovered by observation. Finally, we may perceive why the particles of the ocean, unequally acted on by the sun and moon, should have oscillations similar to the ebbling 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 confesses, 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 judicially 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 inestimable 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 astronomical 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; Precession of the Equinoxes; Motion of the Earth's Axis; Perturbation of the Planets, Moon, and Satellites; Tides, Libration of the Moon, &c.

But as the investigation of laws by which particles of matter gravitate to spheres and other forms 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 gravitation suppose the action to be confined to simple gravitating points; now as no such points exist in nature, it becomes requisite to consider the effect which an assembly of these points will produce when arranged in different forms. Newton, who first entered upon these speculations, investigated almost all the cases which are applicable to physical astronomy, but professor Playfair has lately extended these researches, and has presented a paper on the subject to the Philosophical 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.

1. Of the gravitation of particles of matter to spheres, and other mathematical figures.

Let A L B M, a l b m, (Plate XV. Astronomy, fig. 124.) 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 \( dp, ep, \) making a very small angle at \( p. \) This may represent the section of a double cone \( dpe \), having \( p \) for the common vertex, and \( d, e \) for the diameter of the circular bases. The gravitation of \( p \) to the matter in the base \( d e \) is equal to its gravitation to the matter in the base \( d, e. \) For the number of particles in \( d e \) is to the number in \( d, e, \) as the surface of the base \( d e \) is to that of the base \( d, e, \) that is, as \( d e \) to \( d, e, \) which is, as \( p d \) to \( p e, \) that is, as the gravitation to a particle \( d, e, \) to the gravitation to a particle \( d, e. \) Therefore the whole gravitation to the matter in \( d e, \) is the same with the whole gravitation to the matter in \( d, e, \) and so in a similar manner, of the gravitation to the matter in the sections of the cones \( dpe, ep, \) by any other concentric surface. Consequentiy, the gravitation to the whole matter contained in the solid \( d g r e, \) is equal to the gravitation to the whole matter in the solid \( d e, \) and the particle \( p \) is still in equilibrium.

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 \( a l b m. \)

It is also evident, that this holds true with respect to all the matter comprehended between \( A L B M, \) and the concentric surface \( p n v, \) passing through \( p; \) in short \( p \) is in equilibrium 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 supposed the spherical shell to be uniform; dense. But \( p \) will still be in equilibrium, although the shell be made up of concentric strata of different densities, provided that each stratum be uniformly dense.

For should we suppose, that in the space comprehended between \( A L B M \) and \( p n v, \) there occurs a surface \( a l b m, \) of different density from all the rest, the gravitation to the intercepted portions \( q r \) and \( s t \) are equal, because the densities of those portions are of equal density, and are proportional to \( p q^2 \) and \( p r^2 \) 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 equal distances from the centre, will be in equilibrium, and will have no tendency to move in any direction."

The equality of the gravitation to the surface \( e d, \) and to the surface \( d, e, \) 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 \( e d, \) and \( q r, \) and \( s t, \) 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 \( dpe, \) of uniform gravitating matter, be divided by parallel sections \( d e, q e, \) &c., the gravitation of a particle \( p \) to the vertex, to each of those sections, is the same, and the gravitations to the solids \( p q r, p de, q de, \) &c., are proportional to their lengths \( p q, p d, q d, \) &c., and 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 \( q p, \) is to the gravitation to the solid \( q de, \) as the number of slices in the first, to the number of slices in the second, that is, as \( p q, \) the length of the first, to \( q d, \) the length of the second. The cone \( d p e \) 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 assigned 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 cylinders, spheres, \( x y z, \) of spherical surfaces, having their centres in \( p; \) the small portions \( x y r, x e d, x i b, \) &c., are held as insignificant, vanishing in the ultimate ratios of the whole solids.

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 so formed, that the lines \( p q, p r, \) are cut in the same proportion by the sections \( d e, q r, \) &c. In a spherical shell, for instance, whole inner and outer surfaces are similar, and similarly posited spheroids, the particle \( p \) will be in equilibrium any where within it; because, in this case, the lines \( p q \) and \( p r, \) are equal; so are the lines \( p s \) and \( p t, \) the lines \( s t \) and \( q d, \) &c., in most cases, however, there is but one situation of the particle \( p \) that satisfies this equilibrium.

But we must 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 similarly 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 placed 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 spherical surface, shell, 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 \( P D, P E, \) containing a very small angle at \( P, \) and cutting the great circle \( A L B M, \) in \( D, E, D', E'. \) About \( P, \) as a centre with the distance \( P C, \) describe the arc \( C D, \) cutting \( D P \) in \( D, \) and \( E P \) in \( E. \) About the same centre describe the arc \( D O. \) Draw \( D F, E, G, \) parallel to \( A B \) and \( C D, \) and cutting \( L C \) in \( f, \) and \( g. \) Draw \( C K, \) perpendicular to \( P D, \) and \( D H, P G, \) perpendicular to \( A B. \) Join \( C D \) and \( C F. \)

Now, let the figure be supposed to turn round the axis \( P B. \) The semi-circle \( A L B \) will generate a complete spherical surface; the arc \( C D \) will generate another spherical surface, having \( P \) for the centre; the small
Gravitation.

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 point $P$, the gravitation of $P$ is the same. If $PT$ touch the sphere in $T$, every portion of the arc $TLB$ will have its substitute in the quadrant $TLB$, 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 $A$ 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 $ab$. It is true, therefore, with regard to the shell comprehended between these 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 still be 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, 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 sphere, shell, or sphere were collected there.

This will be found to be a very important proposition.

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 $d$.

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 be the last Cor.

The mutual gravitation of two spheres of uniform density, 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 to be 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 $\frac{1}{d^2}$ 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 \( d \) the distance of their centres, is \( A \times B \over d^2 \). For the tendency of one particle of A to B, being the aggregate of its tendencies to every particle of B, is \( A \times B \over d^2 \). Therefore, the tendency of the whole of A to B must be \( A \times B \over d^2 \). 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 attracted bodies, then the compounded force with which two spheres attract each other mutually, is as the distance between the centres of the spheres.

Cafe 1.—Let AEBF (fig. 125) be a sphere; S its centre; P a particle attracted; PASB the axis of the sphere passing through the centre of the particle; E, ef, 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 EF. The centripetal force of the point H on the particle P, exerted in the direction of the line PH, is as the distance \( PH \); and the same exerted in the direction of the line PG, or towards the centre S, is as the length PG. Therefore, the force of all the points in the plane EF, (that is, of the whole plane) by which the particle P is attracted towards the centre S, is as the distance PG multiplied by the number of those points, that is, as the solid contained under that plane EF, and the distance PG. And, in like manner, the force of the plane ef, by which the particle P is attracted towards the centre S, is as that plane multiplied into its distance \( Pg \); or as the equal plane E F multiplied into that distance \( Pg \); and the sum of the forces of both planes is as the plane \( EF \), multiplied into the sum of the distances \( PG + Pg \), that is, as that plane multiplied into twice the distance PS of the centre and the particle; that is, as twice the plane EF, multiplied into the distance PS, or as the sum of the equal planes \( EF + ef \) 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 PS, that is, as the whole sphere, and the distance PS jointly.

Cafe 2.—Let the particle P now attract the sphere AEBF, and, by the same reasoning, it will appear that the force with which the sphere is attracted is as the distance PS.

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 same sphere conjointly, 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, that is, with 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 AEBF, (fig. 126.) and because the force of the plane ef upon the particle is as the solid contained under that plane and the distance \( Pg \); and the contrary force of the plane E F, is as the solid contained under that plane and the distance \( Pg \); 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, ef, 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 \( PS \) 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 AEBF, 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 \( PS \) of the centres.

7. If the structure 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 centre, 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 the suppositions cause bodies to revolve in conic sections, and compose spherical bodies, whose centripetal forces observe the same law of ineratce or decrease, in the recels from the centre, as the forces of the particles themselves do.

8. If a circle AEB (fig. 127.) be described round the centre S, and two circles E F, ef, be also described round the centre P, interfiding the former in E and e, and the line PS in F and f; and if E D, e d, be drawn perpendicular to PS; then if the distance of the arcs E F, ef, be 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 Pe interfides the arc EF in g, and the right line EE, which coincides with the evanescent arc Ee, be produced and meet the right line PS in T; and the perpendicular SG be drawn from S to PE, because the triangles DTE, D'T'e, DES, are similar, D'd will be to E'g as DT to TE, or DS to E'S; and because the triangles E e g, ESG, are similar, E'e will be to eg or F f as ES to SG; and exæquo, D'd is to E f as D'E to SG; that is, (because the triangles PDE, P GS, are similar,) as P E to P S.

9. If a superficies, as E F e (fig. 128.) be supposed to have its breadth infinitely diminished, and that by its revolution round the axis PS it describes a spherical concavo-convex solid to the several equal particles of which 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 spherical super- superficies F E, which is generated by the revolution of the arc P E, and is interfied any where, as in r, by the line \( d c \), the annular part of the superficies generated by the revolution
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 that 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 × D d.

If the line DF be now considered as divided into innumerable equal particles, each of which may be called D d, then the superficies FE will be divided into so many equal annuli, whole forces will be as the sum of all the rectangles P D × D d; that is, as \( \frac{1}{2} P E^2 - \frac{1}{2} P D^2 \) and therefore as \( PE^2 \). Let now the superficies FE be multiplied into the altitude Ff, and the force of the solid \( E F f \) exerted upon the particle \( P \) will be as \( DE^2 \times Ff \); that is, if the force be given which any given particle, as \( Ff \), will exert 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 \( DE^2 \times Ff \), and that force not given conjointly.

10. If to the several equal parts of a sphere \( A B E \) (fig. 130.) described about the centre \( S \), there tend equal centripetal forces; and if from the several points \( D \), perpendicular to the axis of the sphere \( A B \), in which a particle \( P \) is placed, meeting the sphere in \( E \); and if in these perpendiculars the lengths \( D N \), be taken as the quantity \( DE^2 \times PS \), and as the force which a particle of the sphere situated in the axis exerts at the distance \( PE \) upon the particle \( P \) 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 suppos'd to be divided into innumerable equal particles \( D N \), and the whole sphere to be divided into so many spherical concavo-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 \( DE^2 \times Ff \), and the force of one particle exerted at the distance \( PE \) or \( PF \) conjointly. But (by the last lemma) \( D N \) is to \( Ff \) as \( P E \) to \( PS \), and therefore \( Ff \) is equal to \( \frac{P S \times D D}{P E} \); and \( DE^2 \times Ff \) is equal to \( \frac{D D \times DE^2 \times PS}{P E} \); and the force of the lamina \( E F f \), is as \( \frac{D D \times DE^2 \times PS}{P E} \), and the force of a particle exerted at the distance \( PF \) conjointly; that is, by the supposition, as \( D N \times D d \), or as the evanescent area \( D N d \). 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 \( \frac{DE^2 \times PS}{P E} \), 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 it, and \( DN \) be made as \( \frac{DE^2 \times PS}{P E} \), 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 \( \frac{DE^2 \times PS}{P E^3} \), 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 \( \frac{DE^2 \times PS}{PE^4} \), the force with which a particle is attracted by the whole sphere will be as the area \( ANB \).

11. Supposing every thing to remain as above, it is required to measure the area \( ANB \), fig. 130.

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 \( PH \) in \( L \), and \( PE \) will be equal to \( PS \times SE^2 \times 2PSD \). But because the triangles \( S P H \), \( S H I \), are similar, \( SE^2 \) or \( SH^2 \) is equal to the rectangle \( PSI \). Therefore \( PE \) is equal to the rectangle contained under \( PS \) and \( PSI \times 2SD \); that is, under \( PS \) and \( 2LS \times 2SD \); that is, under \( PS \) and \( 2LD \). Moreover \( DE \) is equal to \( SE^2 - SD^2 \), or \( SE^2 - LS^2 + 2SLD \); that is, \( 2SLD - LD^2 - ALB \). For \( LS^2 - SE \), or \( LS^2 - SA^2 \), is equal to the rectangle \( ALB \). Therefore if instead of \( DE \) we write \( 2SLD - LD^2 - ALB \), the quantity \( DE \times PS \), which is as the length of the ordinate \( DN \), will now resolve itself into three parts, \( 2SLD \times PS \); \( ALB \times PS \); \( PE \times V \); where, if instead of \( V \), we write the inverse ratio of the centripetal force, and instead of \( PE \), the mean proportional between \( PS \) and \( 2LD \), 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 \( PE^2 \); and \( DN \) will become as \( SL^2 - \frac{1}{2} LD^2 - ALBD \), and the given part of the ordinate drawn into the length \( AB \) will describe the rectangular area \( SL \times AB \); and the indefinite part \( LD \) drawn perpendicularly into the same length with a continued motion, according to such a law that its motion in either direction may, by increasing or decreasing, remain always equal to the length \( LD \), will describe the area \( LB^2 - LA^2 \), that is the area \( SL \times AB \); which taken from the former area \( SL \times AB \), leaves the area \( ALBD \). But the third part \( LD^2 \), drawn in a similar manner with a continued motion perpendicularly into the same length, will describe the area of an hyperbola, which subtracted from the area \( SL \times AB \) will leave \( ALBD \) the area sought. Whence this construction of the problem arises. At the points \( L, A, B \) (fig. 131.) erect the
the perpendiculars L I, A a, B b; making A a equal to L B, and B b equal L A. Making L I and L B affymptotes, describe through the points a, b, the hyperbolic curve a b: and the chord a b being drawn, will enclose the area a b a equal to the area required A N 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 \(\frac{P E^3}{2AS^3}\) for V, and
\[
2 PS \times LD \text{ for } PE^2; \quad \text{and DN will become as } \frac{SL \times AS^2 \times AS^2}{PS \times SL - 2PS \times LD^3}; \quad \text{that is, (because}
\]
\[
P S, A S, S I, \text{ are continually proportional), as } \frac{LS I}{LD} = \frac{1}{2}.
\]
\[
SI = \frac{ALB \times SI}{2LD}.
\]
The first three parts be then drawn into the length A B, the first, \(\frac{LS I}{LD}\), will generate the area of an hyperbola; the second, \(\frac{1}{2} SI\), the area \(\frac{1}{2} AB \times SI\); and the third, \(\frac{ALB \times SI}{2LD} - \frac{2LD}{2LA}\), the area \(\frac{ALB \times SI}{2LD}\), that is, \(\frac{1}{2} AB \times SI\) from the first substract the sum of the second and third, and there will remain AN B, the area sought. Hence arises this construction of the problem. At the points L, A, S, B, (fig. 132) erect the perpendiculars L I, A a, S I, B b of which suppose S I equal S I; and through the point S, to the affymptotes L I, L B, describe the hyperbola a b, meeting the perpendiculars A a, B b in a and b, and the rectangle A S I, subtracted from the hyperbolic area A a b B, will leave A N 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 \(\frac{PE^4}{2AS^4}\) for V, then
\[
\sqrt{2PS + LD} \text{ for } PE, \quad \text{and DN will become as } \frac{SI^4 \times SL}{\sqrt{SI^4 \times LI} - 2SI^4 \times \sqrt{SI^4 \times LD}}.
\]
\[
SI \times ALB - \frac{1}{2} \times SI \times LD^3
\]
The three parts, drawn into the length A B, produce as many areas, namely,
\[
\frac{2SI^4 \times SL}{\sqrt{SI^4 \times LD}}.
\]
\[
\text{into } \frac{1}{\sqrt{LA} - \frac{1}{\sqrt{LB}} \times SI^4 \times \sqrt{SI^4 \times LD}}.
\]
\[
\text{and } \frac{SI^4 \times ALB}{\frac{3}{2} \sqrt{SI^4}} \text{ into } \frac{1}{\sqrt{LA} - \frac{1}{\sqrt{LB}}} \times SI^4 \text{ and thence,}
\]
\[
SI^4 + \frac{2SI^4}{3LI} \text{ and thence, by substracting the latter terms from the former, become } \frac{4SI^4}{3LI} \text{; therefore the entire force with which the particle P is attracted towards the centre of the sphere, is as } \frac{SI^4}{LI}; \quad \text{that is, reciprocally as } PS^4 \times PL.
\]

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 I, 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^4 + PI, the attraction in I will be reciprocally as SA^3 into PI; that is, because SA^4 is given reciprocally as PI; and the proportion 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 \(DE^3 \times PS\); therefore, if E be drawn, that ordinate for any other place of the particle, as I, will become (substituting PS and PE for IS and IE) as \(\frac{DE^3 \times IS}{IE \times V}\).

Suppose the centripetal forces proceeding from any one 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^2 \times PS and PE^3 \times IS, PE \times IE^3, and PE^4 \times IE^4, whose ratio to each other is as PS \times IE \times IE^2 to IS \times PE \times PE^2. Because SI, SE, SP, are continually proportional, the triangles SPE, SEI, are alike; and thence 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^2 to SA \times PE^2. But the ratio of PS to SA is sub-duplicate of that of the distances PS, SI; and the ratio of IE^2 to PE^2, (because IE is to PE as IS to SA) is sub-duplicate of that of the forces at the distances PS, SI; 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 centre, etc.
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 \( R S D \) a segment thereof contained between the plane \( R D S \), and spherical supericies \( R S \). Let \( D B \) be intersected in \( F \) by a spherical supericies \( E F G \), described from the centre \( P \), and let the segment be divided into the parts \( E F G, F E D \); let that surface be supposed not purely mathematical, but physical, having some but a very inconsiderable thickness: let that thickness be called \( O \), and (by what Archimedes has demonstrated) that supericies will be as \( P F^2 \times O \): let us suppose besides, the attractive forces of the particles of the sphere, to be reciprocally as that power of the distances of \( n \) is the index; and the force with which the surface \( E F G \) attracts the body \( P \) will be as \( \frac{D E^2 \times O}{P F^2} \); that is,

\[
\frac{2 \cdot D E \times O}{P F^2} - \frac{D F^2 \times O}{P F^2} = \text{Let the perpendicular } F N, \text{ drawn into } O, \text{ be proportional to this quantity, and the curvilinear area } D B, \text{ which the ordinate } F N, \text{ drawn through the length } D B, \text{ with a continued motion describes, will be as the whole force with which the whole segment } R S D \text{ attracts the body } P. \]

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 \( E B K F E \) 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 exerted by spherical bodies. In the thirtieth section of the Principia, the author shews the manner in which the law of attraction is investigated for other bodies; the most interesting results are contained in the following propositions.

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 attractive body is compounded, decrease as the attracted body recedes, in a triplicate, or more than a triplicate 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 most minute interval.

17. If two bodies, similar to each other, and consisting of matter equally attractive, attract separately two particles, proportional to those bodies, and in a similar fashion 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 same 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 each particle is attracted, will tend to the common centre of gravity of the attracting bodies; and will be the same as if these attracting bodies, preserving their common centre of gravity, should unite there, 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 point 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 superficies, will decrease in the ratio of a power whose base is the distance of a particle from the plane, and is indeed left by three than the index of the power of the distances.

Though the above propositions are sufficient for all astronomical investigations, yet there are many questions in natural philosophy, particularly those which relate to the attraction of mountains, which require that these enquiries should be extended to a greater variety of cases; and the following propositions form a part of the interesting investigations of professor Playfair, as he has communicated them to the public, in the first volume of the Edinburgh Transactions, as above-mentioned: they were suggested to the learned author by the experiments which have been made of late years concerning the attraction of terrestrial bodies, particularly by Dr. Malpighie on the attraction of mountains, and by Mr. Cavendish, on the attraction of leaden balls, as has been deferred at length under the article "Density," to which the reader is referred.

I. To find the solid into which a mass of homogeneous matter must be formed, to attract a particle given in position with the greatest force possible in a given direction.

Let \( A \) (fig. 136.) be the particle given in position, \( A B \) the direction in which it is to be attracted; and \( A C B \) a section of the solid required, by a plane passing through \( A B \).

Since the attraction of the solid is a maximum by hypothesis, any small variation in the figure of the solid, provided the quantity of matter remain the same, will not change the attraction in the direction \( A B \). If, therefore, a small portion of matter be taken from any point \( C \) in the superficies of the solid, and placed at \( D \), another point in the same superficies, there will be no variation in the force which the solid exerts on the particle \( A \) in the direction \( A B \).

The curve \( A C B \), therefore, is the locus of all the points, in which a body, being placed, will attract the particle \( A \) in the direction \( A B \), with the same force. This condition is sufficient to determine the nature of the curve \( A C B \). From any point in that curve, draw \( C E \) perpendicular to \( A B \); then if a mass of matter, placed at \( C \) be called \( m \), \( \frac{m}{A C^2} \) will be the attraction of that mass on \( A \), in the direction \( A C \), and \( \frac{m^3 \times A E}{A C^4} \) will be its attraction in the direction \( A B \); as this is constant, it will be equal to \( \frac{m^3}{A B^4} \) and, therefore, \( A B \times A E = A C \).

All the sections of the required solid, therefore, by planes passing through \( A B \), have this property, that \( A C' = A \).
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Let $A B^2 \times A E$; and as this equation is sufficient to determine the nature of the curve to which it belongs, therefore all the sections of the fold, by planes that pass through $A B$, are similar and equal curves; and the fold, in consequence, may be conceived to be generated by the revolution of $A C B$, any one of those curves, about $A B$ as an axis.

The fold so generated may be called the fold of greatest attraction, and the line $A C B$ the curve of equal attraction.

II. To find the equation between the co-ordinates of $A C B$, the curve of equal attraction.

From $C$ (fig. 136) draw $C E$ perpendicular to $A B$; let

$$A B = a, A E = r, E C = y.$$ 

If it has been found that $A B^2 \times A E = A C^2$, that is $a' = (x^2 + y^2)^{1/2}$, or $a' x = (x^2 + y^2)^{1/2}$, which is an equation to a line of the fifth order.

To obtain $y$ in terms of $x$, let $x' = a' x = a x$ and $y = x' - x^2$.

Hence $y = a x$, both when $x = 0$, and when $x = a$. Also, if $x$ be supposed greater than $a$, $y$ is impossible. No part of the curve, therefore, lies beyond $B$.

The parts of the curve opposite the sides of the line $A B$ are similar and equal, because the positive and negative values of $y$ are equal. There is also another part of the curve on the side of $A$, opposite to $B$, similar and equal to $A C B$; for the values of $y$ are the same, whether $x$ be positive or negative.

III. The curve may be easily constructed without having recourse to the value of $y$ just obtained.

Let $A B = a$ (fig. 136) $A C = z$, and the angle $B A C = \varphi$. Then $A E = A C \cos \varphi = z \cos \varphi$, and so $a' x = a x = a x' = z \cos \varphi$; or $A C' \cos \varphi = z'$; hence $z = a \cos \varphi$.

From this formula the value of $A C$ or $z$ may be found, if $\varphi$ or the angle $B A C$ be given; and if it be required to find $x$ 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 $A B$, a circle $B F H$ be described from the centre $A$, if $A C$ be produced to meet the circumference in $F$, and if $F G$ be drawn at right angles to $A B$, then $A C = \sqrt{A B \times A G} = A C$. The circle is then a circle of attraction.

Therefore, if from the centre $A$, with the distance $A B$, a circle $B F H$ be described; and if a circle be also described on the diameter $A B$ as $A K B$, then drawing any line $A F$ from $A$, meeting the circle $B F H$ in $F$, and from $F$ describing the perpendicular on $A B$, intersecting the semicircle $A K B$ in $K$; and if $A K$ be joined, and $A C$ made equal to $A K$, the point $C$ is in the curve.

For $A K = \sqrt{A B \times A G}$, from the nature of the circle, and therefore $A C = \sqrt{A B \times A G}$, which has been known to be a property of the curve. In this way a number of points of the curve may be determined; and the fold 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 $A C B$.

1. Let $A E C$, $A F G$ (fig. 137.) be two radii indefinitely near to one another, meeting the curve $A C B$ in $C$ and $F$, and the circle described with the radius $A B$ in $E$ and $G$.

Let $A C = z$ as before, the angle $B A C = \varphi$, and $A B = a$. Then $G E = a \varphi$, and the area $A G E = \frac{1}{2} a^2 \varphi$, and since $A E : A C : : \cot \angle A E G : \cot \angle A C F$, the factor $A C F = \frac{1}{2} a^2 \varphi$. But $x' = a \cos \varphi$, and hence the factor $A C F = \frac{1}{2} a^2 \varphi$, and consequently the area $A C B = \frac{1}{2} a^2 \varphi$, because the curve is sufficient to make $A C F = \frac{1}{2} a^2 \varphi$, and consequently the area $A C B = \frac{1}{2} a^2 \varphi$.

The whole area of the curve therefore is $\frac{1}{2} a^2$, or $\frac{1}{2} A B^2$; for when $\varphi$ is a right angle, $\varphi = 1$. Hence the area of the curve on both sides of $A B$ is equal to the figure of $A B$.

2. The value of $x$, when $y$ is a maximum, is easily found. For when $y$ and therefore $y'$, is a maximum, $\frac{1}{2} a^2 - x = \alpha x$, or $a x' = a x$, that is, $x = \frac{a^2}{3}$.

Hence calling $b$ the value of $y$ when a maximum, $b' = \frac{a^2}{3}$.

3. It is material to observe, that the radius of curvature $A$ is infinite: for since $y = a x + x'$, $x' = \frac{a^2}{x}$.

But when $x$ is very small, or $y$ indefinitely near to $A$, $\frac{y}{x}$ becomes the diameter of the circle, having the same curvature with $A C B$ at $A$; and when $x$ vanishes, this value of $\frac{y}{x}$, or $\frac{a^2}{x - x}$ becomes infinite, because of the diurnal $x$ being in that case $x$.

The diameter, therefore, and the radius of curvature at $A$ are infinite. In other words, the circle, having its centre in $A$ produced, and passing through $A$, can be described with so great a radius, that at this point $A$ it will be within the curve of equal attraction.

The fold 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 $B$, the other extremity of the axis, since $y = a x + x'$, or $x' = \frac{a^2}{a - x}$, we have $\frac{y}{a - x} = \frac{a x^2}{a - x}$.

But at $B$, when $a - x$, or the abscissa reckoned from $B$ vanishes, $\frac{y}{a - x}$ is the diameter of the circle, having the same curvature with $A C B$ in $B$. But when $a - x$ is $x$, or $a = x$, both the numerator and denominator of the fraction $\frac{a^2 - x^2}{a - x}$ vanishes, so that its ultimate value does not appear. To remove this difficulty, let $a - x = z$, or $x = a - z$, then we have $y' = (a - z)^2 - (a - z)^2$.

But when $z$ is extremely small, its powers higher than the first may be rejected; and therefore $(a - z) = a \left(1 - \frac{x}{a}\right)^{\frac{3}{2}} = a \left(1 - \frac{1}{2} \frac{a}{a} \sqrt{c}\right)$.

Therefore the equation to the curve becomes in this case, $y' = a x + \left(1 - \frac{2}{3} \frac{a}{a} \sqrt{c}\right) a^2 + 2 a z = \frac{a}{a} a z$.

Hence
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Hence \( \frac{4\pi}{2} \), or the radius of curvature at \( B = \frac{3}{7} a \). 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 \( C \)
cut \( C D \) 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 \( A C \).

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 \( C C' = \pi (D C^2 -
D C') = 2\pi DC \times C \). Now, \( 2DC \times C \) is the
variation of \( y^2 \), or \( y \), while \( DC \times CC' \) is, the
curve \( B C A \) into the curve \( B C A \); that is, \( 2DC \times C \)
corresponds to the fluxion of \( y \), or of \( a'x' - x' \), taken on the supposition that \( x \) is constant and \( a \) is variable, namely \( \frac{2}{3} a \).
Therefore, the space generated by \( C C' = \frac{4\pi}{3} a^2 y \).

If this expression be multiplied by \( z \), we have the ele-
ment of the shell = \( \frac{4\pi}{3} a^2 x' d \).

In order to have the soli- body of the shell \( A C B \), the
above expression must be integrated relatively to \( x \), that is,
supposing only \( z \) variable, and it is then \( \frac{1}{2} \times \frac{4\pi}{3} a^2 x' d \).

But \( C = 0 \), because the fluent vanishes when \( x \) vanishes,
then, the expression, \( \frac{4\pi}{3} a^2 y \), is, the
portion of the shell \( A C = \frac{3}{7} a \), \( a \), and when
\( x = a \) the whole shell = \( \frac{4\pi}{3} a^2 x \).

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 = \( \frac{4\pi}{5} a^2 \).
The same is true for every other indefinite-
thin shell, into which the solid may be supposed to be divided.
And, therefore, the whole of the attraction of the solid
is equal to \( \frac{\pi}{5} a \), supposing \( a \) variable, that is, \( \frac{4\pi}{5} a \).

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 = \( \frac{\pi}{6} a^2 \), \( \frac{4\pi}{5} a \); the attraction
of the solid \( A B \) (fig. 136), is, therefore, to that of
the sphere on the same axis as \( \frac{4\pi}{5} a \), to \( \frac{4\pi}{6} a \), or as 6 to 5.

VI. To find the content of the solid \( A B \), we need only
integrate the fluxionary expression for the content of
the shell, namely, \( \frac{4\pi}{3} a^2 y \). We have then \( \frac{4\pi}{15} a \), the con-
tent of the solid \( A B \). Since the solidity of the
sphere on the axis \( A \) is \( \frac{3}{6} a \), the content of the solid
\( A B \) is to that of the sphere on the same axis as \( \frac{4\pi}{15} a \)
to \( \frac{4\pi}{5} a \); that is, as \( \frac{4}{15} \) to \( \frac{1}{5} \), or as 8 to 5.

VII. Lastly, to compare the attraction of this solid with the
attraction of a sphere of equal bulk. Let \( m \) be any given
mass of matter formed into the solid \( A B \); then for determin-
ing \( A B \), we have this equation \( \frac{4\pi}{5} a = m \), and \( a =
\frac{15}{4\pi} \sqrt{\frac{m}{5}} \); and, therefore, also, the attraction of the solid,

\[
\left( \frac{4\pi}{5} a \right) \left( \frac{15}{4\pi} \sqrt{\frac{m}{5}} \right) = m \left( \frac{\frac{4}{5} \cdot \frac{3}{4} \pi}{\pi} \right) = \frac{m}{\frac{15}{16} \pi} \cdot \frac{16}{25}.
\]

Again, if \( m \) be formed into a sphere, the radius of that
sphere = \( \frac{\pi}{3} \cdot \frac{4}{3} \cdot m \), and the attraction of it on a particle at
its surface \( m^2 \left( \frac{3}{4\pi} \right) = m \left( \frac{16\pi}{25} \right) \).

Hence the attraction of the solid \( A B \), is to that of
a sphere equal to it, as \( m \left( \frac{\pi}{25} \right) \), \( \frac{16}{9} \); that
is, as \( \frac{25}{2} \) to \( \frac{25}{9} \), or as 3 to 2, the cube root of 25.

The ratio of 3 to \( \frac{25}{9} \), is nearly that of 3 to \( \frac{25}{9} \),
or of 81 to 79; and this is therefore also nearly equal to the
ratio of the attraction of the solid \( A B \), 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 greatell attraction exerts
its force, is in contact with that solid. Let it now be sup-
posed, that the distance between the solid and the particle is
given, the solid being on one side 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 find the solid.

Let the particle to be attracted be at \( A \) (fig. 137), from \( A \)
draw \( A \), perpendicular to the given plane, and \( B E F \) be
any straight line in that plane drawn through the point \( A \); it is
evident that the axis of the solid required must be \( A A' \)
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 \( (y = a'x - a) \), 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
\( A' \) is the radius, for its base.

To find the solid content of such a segment, \( C D \) being
\( = y \), and \( C = x \); we have \( y = a x - a \), and
\( y^2 = a^2 x^2 - a^2 y = a^2 x^2 - x \), the
cylinder, which is the element of the solid segment.

Therefore \( \frac{4\pi}{3} y \), or the solid segment intercepted be-
tween \( B \) and \( C \), must be \( \frac{4\pi}{3} a' x - \frac{4\pi}{3} x + C \). This
must vanish when \( x = a \), or when \( C \) comes to \( B \), and there-
force \( C = \frac{4\pi}{15} a^3 \). The segment therefore intercepted between \( B \) and \( C \), the line \( AC \) being \( x \), is \( \frac{4\pi}{15} a^3 - \frac{3\pi}{3} x^3 \).

This also gives \( \frac{4\pi}{15} a^3 \) for the content of the whole solid, when \( x = \alpha \), the same value that was found by another method at \( VI \).

Now, if we suppose \( \alpha \) to be \( = \alpha \), and to be \( b \), the solid content of the segment becomes \( \frac{4\pi}{15} a^3 - \frac{2\pi}{3} x^3 \), for \( \frac{2\pi}{3} b^3 \) which must be made equal to the given solidity, which we shall suppose \( m \), and from this equation \( a \), which is yet unknown, is to be determined. If then for \( a \), we put \( u \), we have \( (\alpha^3 - \frac{1}{b}; \alpha^2 - \frac{1}{b}; \alpha = m \), or \( \frac{2\pi}{3} u = \frac{m^3}{4\pi} - \frac{\frac{2\pi}{3}}{b} \).

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 \( \frac{15m^3}{\pi} - \frac{\frac{2\pi}{3}}{b} = \alpha \), \( \alpha^3 - \frac{2}{b} u = \alpha \), and \( \alpha^3 - \frac{2}{b} u = \frac{2}{3} b \), that is \( a^3 = \frac{2}{3} b \), or \( a = b \times (\frac{2}{3}) \).

\[ \sum 729 \]

19. 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 \( AHB \) (fig. 138), be a section of the solid, by a plane passing through \( ADB \) its axis. Let \( G \) be any point in the superficies of the solid, \( F \) a perpendicular from \( G \) on the plane \( AHB \), and \( GB \) a perpendicular on the axis. Let \( A = x \), \( E = y \), \( F = z \), then \( x, y, z \), and \( a \) are the three co-ordinates by which the superficies is to be defined.

Let \( A = a \), \( E = \alpha \), \( H = y \), then from the nature of the curve \( AHB \), \( y^3 = a \times z^3 - a \), or \( x, y, z \), and \( A \) are the three co-ordinates by which the superficies is to be defined. Therefore \( E^2 + F^2 = E^2 \), that is \( z^2 + v^2 = y^2 \), and by substitution for \( y \) in the former equation, \( z^2 + v^2 = a^2 \times x^2 - a^2 \), or \( (x^2 + v^2 + z^2) = a^2 \times x^2 \), which is the equation to the superficies of the solid of greatest attraction.

2. If we suppose \( E, F, \) and \( x \), to be given \( b \), and the solid to be cut by a plane through \( F \) and \( C \) (\( CD \) being parallel to \( A \)) making on the surface of the solid the section \( DGC \); and if \( AK \) be drawn at right angles to \( AB \), meeting \( DC \) in \( K \), then, by writing \( b \) for \( x \) in either of the preceding equations, \( b^3 + v^3 = a \times b^3 - x^3 \), and \( b^3 + v^3 = a \times b^3 - x^3 \) for the equation to the curve \( DGC \), the co-ordinates being \( F \) and \( K \), because \( K \) is equal to \( A \) or \( x \).

This equation also belongs to a curve of equal attraction; the plane in which that curve is being parallel to \( AB \), the line in which the attraction is eliminated, and distant from it by the space \( b \).

Instead of reckoning the abscissa from \( K \), it may be made to begin at \( C \). If \( A \) or \( C \) or \( b \), then the value of \( b \) is determined from the equation \( b^3 = a \times b^3 - b^3 \), and if \( x = b + v \), \( b \), and \( v \) being put for \( C \), \( v = a \times (b + v) \), \( b^3 = (b + v) \), \( b^3 = a \times (b + v) \), \( b^3 = (b + v) \), \( b^3 = \alpha \times (b + v) \).

When \( b \) is equal to the maximum value of the ordinate \( E \) (IV. 3), the curve \( DGC \) 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 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 \( n \) power of the distance, or as \( \frac{1}{m} A \), then the attraction in the direction \( A \) will be \( \frac{AE}{AC^n} \), and if we make

\[ \frac{1}{A E} \]

\[ A \]

\[ \frac{1}{AC^n} \]

\[ \frac{1}{A B} \]

\[ \frac{1}{A B} \]

\[ \frac{1}{A B} \]


If \( m = 1 \), or \( + 1 = 2 \), this equation becomes \( y^2 = a \times x - x^3 \), 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 \( + 1 = 4 \), the equation is \( y^3 = a \times x^3 - x^3 \), which belongs to a line of the fourth order.

If \( m = 4 \), and \( + 1 = 5 \), the equation is \( y^4 = a \times x^3 - x^3 \), 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 clafs of similar problems be resolved. Whenever the property that is to exist in the greateft 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 it, for instance, be required to find a solid given in magnitude, such that from all the points in it, straight lines being drawn to any number of given points, the sum of the squares of the lines so drawn shall be a maximum. It will be found, by reason of, 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 be always of the same magnitude. Now, the sum of the squares of the lines drawn from any point, to all the given points, may be shewn by plane geometry, to be equal to the square of the line drawn to the centre of gravity of the 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.
GRAVITY, 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 \( f(x, y, z) \) and \( z \) 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 superificies, in which the function \( z \) is every where of the same magnitude. That is, if the triple integral \( \int \int \int z \) be the greatest or least possible, the superificies 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 \( \int \int z \) 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 variatum, 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 (fig. 136) 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 superificies 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 one place \( C \), as is accumulated without the surface, at some other point \( H \). But the action of any quantity of matter within the superificies \( A\, B\, C\, H \) on \( A \) is greater than the action of the same without the superificies \( A\, B\, C\, H \). The solid \( A\, B\, C\, H \) therefore by any change of its figure will lose more attraction than it gains. Thus its attraction not distinguished by any much 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 vanishes, and the spheroid passes into a sphere. When a sphere passes into an oblate spheroid its attraction varies at first decreasing slowly, and continues to do so till its oblate-ness, 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 \( \frac{2}{3} \) the attraction of a sphere of equal solidity.

Of all the cylinders given in mafs 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 same 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 force possible, in the direction of a line bisecting the base, when the altitude of the semi-cylinder is to the radius of its base as 125 to 216.

Gravitation, Centre of. See Center.

Gravitation, Line of. See Line.

Gravitation, Plane of. See Plane.

Gravitation, Terrestrial, is that force by which all bodies are continually urged towards the centre of the earth. It is in confluence of this force that a body cannot remain at rest on the surface of the earth, without exercising a pre- force either on some intermediate body, or on that portion of the surface of the earth which sustains it; and the intensity of this force is measured by the degree of pre- force produced in a given mass. The tension of a string, by which a weight is suspended, arises from the force of gravity. The spring yard, an instrument fold at the loops for weighing, is extremely well adapted to illustrate the effect of the force of gravity; the suspended substance draws out a scale by overcoming the resistance of the spring. These machines are not capable of great exactness, but if an instrument of this kind could be made with sufficient accuracy, the alteration of the scale, (the weight remaining the same) would show 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 32,\( \frac{1}{3} \) feet, that is, it would strike an obstacle with the same force as another body would of the same mass, which was moving uniformly with the velocity of 32, feet per second.

The density of the earth being about \( 5 \frac{1}{2} \) 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 just 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, opposit 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 fourth 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


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Gravity is equal \(0.00694\) 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 but that matter might exist which was not endowed with this property, and fuggels 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 everywhere such as to produce the appearance of an attraction, varying like that of gravitation. Such an etherial 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 this 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 preface 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 elasticity.

Dr. Young observes, that a similar combination of a simple preface 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 intervening 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 atmospherical preface, 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 preface with the same force as would be required for repelling the hemispheres; for it allows 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 solid 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 afford our experimental investigations.

La Place, after having shewn 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 ascertaining this question in a satisfactory manner. Indeed, says this great author, of forming hypotheses on this subject, let us consider 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 by which 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 re-action, 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 compression 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 as whatever fulbance 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 terminates 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 suppress 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 fame 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 peculiar 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 this cause, a velocity must be supposed to exist in the centre 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 indivisible instant to the extremities of the planetary system.

Do any other forces act on the heavenly bodies besides their mutual attractions?

We are acquainted with none, 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 depression 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 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 surpass this gravity, since they inflect 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 stars which form a nebula, which in this point of view may be considered as a great luminous body. There is no reason, however, which absolutely forbids us to consider all bodies in this manner. Many phenomena are favourable to the hypothesis, 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 astronony and natural philosophy. But the impossibility of ascertaining these figures, renders this investigation useles to the advancement of science.

Some geometriions, 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 bulwarks of hydrostatics.

Gravity, absolute or true, is the whole force wherewith 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 one,
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one, it is said to be specifically, or in species, 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, laws of the specific, and levity 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 has twice its gravity under the same bulk.

Hence, the specific gravities of equal bodies are as their densities.

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 densities.

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, looses 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 sustained by the resistance of the ambient water. Therefore, such a part of the weight of the leaden cube must be sustained by the resistance 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, lose 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 solid, to the whole weight.

4. Two solids, equal in bulk, lose 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 loses 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 loses 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 solid 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, fall a weight, which is in equilibrium therewith in the air. Immerge the globe successively in the several fluids, whose specific gravities are to be determined, and observe the weight which balances it in each. These several weights, subtracted, severally, from the first weight, the remains are the parts of the weight lost in each fluid. Whence the ratio of the specific gravity of the fluid is seen.

Hence, as the densities are as the specific gravities, we find the ratio of the densities 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 subsist (if it be specifically lighter) is to be added to the weight left. 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 looses 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 to 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 masses 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 lost 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, descends 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. 47.3 pound of copper looses 53 pounds of its weight in water; therefore a power of 42 pounds 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, is 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 solid immersed therein; the specific gravities of fluids are reciprocally as the parts of the same body immersed therein.

2. A solid, therefore, immerses 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
the whole body will be immersed; 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 collateral columns 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
fold.

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 same weight with the whole fold.

XIII. The specific gravity of a fold is to the specific
gravity of a lighter fluid, wherein it is immersed, as the
bulk of the part immersed is to the whole bulk.

XIV. The specific gravities of equal folds are as their
parts immersed 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 fold wholly im-
mered 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 fold; from the
given bulk of the fold, 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 fold; the remainder is the force required.

E. g. Suppose the force necessary to detain a fold eight
feet in bulk, and 150 pounds in weight, under water, re-
quired; since a cubic foot of water is found to weigh 10
pound, the weight of water under the bulk of eight feet, is
60; whence, 150, the weight of the fold, being
subtracted; the remainder 90 is the force necessary
to detain the fold 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 fold 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 specifi-
cally lighter than the fame, and consequently it will
swim.

XVII. The force employed to retain a specifically lighter
fold, under a heavier fluid; and the weight lost by a heavier
fold 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 de-
monstrable from the principles of mechanics, but are conform-
able 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 ex-
hibited; where the laws of specific gravitation are well illus-
trated. 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 dif-
cult, 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
Hydrostatics. It appears to have been known to Archimedes,
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 quo-
tient 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 magni-
tude, 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 such as are lighter than water, may also be very con-
veniently determined by means of a common balance, employ-
ing a phial with a conical ground flint or filling it with
water and then either with a given fluid, or with a portion
of the fold of which the weight has been ascertained, to-
gether with as much water as is sufficient to exclude the air.

It is necessary to attend to a great number of minute cir-
cumstances when we wish to determine the specific gravities
of substances to a great degree of accuracy; these will be
particular noticed when describing the particular instru-
ments that have been invented for the purpose. See Hy-
drostatic 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 togeth-
er 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 ex-
periments it is necessary to be aware that a considerable
charge of the joint bulk of two substances is often produced by
their mixture, and that in general their dimensions are con-
derably contracted. Thus, 18 gallons of water and 18
quarters of alcohol, instead of 36 gallons, make only 35;
consequently the specific gravity of the compound is one
35th less 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-fortieth of
that bulk.

For measuring the specific gravity of gases, Mr. Le
tie 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 Lavoisier. Davie's table is
compiled with great diligence from many different authors;
Lavoisier's is chiefly extracted from Brünn; it is carried
GRAVITY.

to four places of decimals, but little dependence can be placed on the last.

**Mineral Productions. Solids.**

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<th>Material</th>
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<td>19.500</td>
</tr>
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<td>Value</td>
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G R A V I T Y.
### Gravity

Extract from Mr. Gilpin's Table; Phil. Trans. 1794.

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<th>50°.</th>
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**Bourdeaux wine**

- 92139 Pear tree
- 92139 Fir, yellow
- 92139 White
- 92139 Male fir
- 92139 Female fir
- 92139 Cypress
- 92139 Line tree
- 92139 ilbert wood
- 92139 Arnott
- 92139 Willow
- 92139 Cedar
- 92139 Juniper wood
- 92139 White Spanish poplar
- 92139 Poplar
- 92139 Saffraas wood
- 92139 Cork

**Animal Substances.**

- 92139 Pearl
- 92139 Coral
- 92139 Sheep's bone, recent
- 92139 Oyster shell
- 92139 Ivory
- 92139 stag's horn
- 92139 Ox's horn
- 92139 Blade bone of an ox
- 92139 Lac
- 92139 Hinglafs
- 92139 Egg of a hen
- 92139 Human blood
- 92139 Blood, buff coat
- 92139 red globules
- 92139 Ewe's milk
- 92139 Ales's milk
- 92139 Marc's milk
- 92139 Goat's milk
- 92139 Cow's milk
- 92139 Woman's milk
- 92139 Whey of cow's milk
- 92139 Wax, white
- 92139 Wax
 GRA

| Wax, yellow | .9548 |
| Lard | .9475 |
| Spermacei | .9433 |
| Butter | .9423 |
| Tallow | .9419 |
| Fat of hogs | .9268 |
| af veal | .9342 |
| of mutton | .9235 |
| of beef | .9232 |
| Ambergris | .9263 |
| Lamp oil | .9233 |
| Solution of pure ammonia | .8970 |

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 are 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 section of. See Paracentric Plane.

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 acute, 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 found to the denomination of melodious, harmonical, or musical.

Gravity is, therefore, that modification of found by which it is considered as grave or low, with respect to, or compared with, other founds, 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 solid 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 lowsness, are but relative things. We commonly call a found acute 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 voice, 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 sound to sound, 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 sound is called musical, and is said to continue at the same pitch. See Chords and Strings, 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 tune. 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 dissonances. See Harmonics and Ratio.

As the gravity of sounds 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 diocese of Lavaur; nine miles N. E. of Lavaur. The place contains 3419, and the canton 7159 inhabitants, on a territory of 135 kilometres, in six communes.

GRAUN, CHARLES HENRY, in Biography, chapel-master to Frederic 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 Grun to Italy to study the Italian language and taste in music, and to engage vocal performers. Grun remained four years in Italy, during which time the king, his royal master, had constructed, in spite of the Turkish war, one of the most magnificent, complete, and convenient theatres in Europe, for which Grun 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 these early productions.

He composed for the Berlin theatre, in the space of fourteen years, from 1742 to 1756, twenty-seven Italian operas;
GRA

and for the church, a Te Deum, and a Passione, 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 Nicholman, set the fong.

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 Zacharias, the celebrated poet and musician of Brunswick, recommending the death of Graun to his muse. No great fires can be laid on panegyrics; however, there are few of Graun's 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 matter 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." "Deutsche Briefe uber die Tonkunst. 1. Band. Berlin 1765.

Now, to reverse the medal; it is denied, by the other party, that Graun was the creator of his own taste, which is the taste of Vinci; they deny, that he is ever pompous or terrible; but say, that an even tenor runs through all his works, which never reach the sublime, though the tender and graceful are frequently found in them; they are equally unwilling to subcribe to his great invention, or the originality of his ideas; and think that still 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 see 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 revived, it would be thought in want of variety and fire.

During the life of his great and illustrious patron, he was revered as much at Berlin as Handel in England; both great men, most affably; 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 Carlini, Colonna, Alessandro Scarlatti, Steffani and Corelli; Graun on that of the inventor of the new style, Vincenzo; who, though extremely and justly admired for the grace and elegance of his melodies, the simplicity of his accomplishment, and the facility and clearness of his style in general, has been far surpassed by Pergolesi, Jomelli, Piccini, Sacchini, and Picchiello. Germany is perhaps more obliged to Graun for smoothing, simplifying, and polishing the rough, labour'd, and inelegant style of their old masters, than to any Italians that have been employed at the imperial court or at Dresden, to set the drams of Apollo 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 greater 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 Pergolesi. Tho' 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 1786, by the late duke of Leeds, then marquis of Camden; and it has continued a flock piece ever since. Many of his duets, and his Tod Jesu are admirable compositions, and he certainly deserves to be ranked very high among the great masters of the last century.

GRAUN, JOHN GOTTLIEB, brother of the above composer, and concert-maste to his late Prussian majesty, Frederick 11. his admirers at Berlin, say that "he was one of the greatest performers on the violin of his time, and most adorably, 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 Da've Regina, and composed masses, which are rendered grand and noble by simplicity and good melody, even in the most labour'd 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 running the hearers: and in his concertos and church music, when that is not the case, the length of each movement is more immediate, than Chiffian patience can endure. Perhaps the truth may lie between these two opinions; and with respect to the chapel-master Graun, it should be remembered, that he was seldom allowed to follow the bent of his own genius.

GRAUNT, JOHN, born April 24, 1662, was brought up to the trade of a haberdasher, but by his good sense 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 entituled "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 admiration 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 trudenes, they should be sure to admit them all. It is generally supposed that Mr. Graunt received valuable assistance from Dr. 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 effectually leading to all the conclusions which have since been established relative to these subjects. After he retired from business, he was admitted a trustee for Sir William Buckhoute, 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. The
The story, though given by Burnet, is abundantly refuted by the writers of the Biographia Britannica. Mr. Grant continued his application to his studies, and made large additions to his "Observations" but two years before his death, which happened on the 18th of April, 1674. He was buried at St. Dunstan's Well, and many of the most eminent and ingenious persons of that time, among whom was Sir William Petty, paid their last respects to his memory. He left behind him a difficult upon the advance of the excise, and some papers on religious topics, which have not been published. It must be mentioned to his honour, that immediately after the publication of his book, Lewis XIV. or his ministers, enacted a law to enforce the most exact register of births and burials that was to be found anywhere in Europe. Biog. Brit.

GRAPEN, a term used by the German miners to express the reddish of any ore after the regular, or metallic part, is run from it. Thus the one of bismuth have behind them, after the regular is melted off, an etchy substance, called bismuth grain, with which, mixed with flints and an alkali, they make a kind of mortar, not distinguishable from the true found made from cobalt. Phil. Trans. N.S. 190.

GRASPSTONE. See Greystone.

GRAUWACKE. See Transition Rocks.

GRAY, Thomas, in Biographia, a distinguished English poet, defended from every respectable citizen of London, was born in Cornhill, December 26th, 1716. His grandfather was a considerable merchant; but his father, Mr. Philip Gray, was of an indolent and reserved temper, and therefore diminished rather than increased 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 suffocation, owing to a too great fulness of blood, which destroyed the red, and he would certainly have been cut off 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 paroxysm. He was probably designed 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. Antrobus, his mother's brother, at that time one of the office 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 nevertheless appeared as a poet among the university congratulators of the prince of Wales's marriage, and his verses were admitted to be the bell of the academical collection. His letters, during this period, to Mr. Well, which are printed by Mr. Malton, show that he had little influence for the gayer studies, or for the signified promotion of the place, and that he had acquired that elastic fluidity 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 laid aside this intention, and never after refuted it. They met in the spring, and his letters from the different stages of his progress, are a proof of the intelligent curiosity with which he viewed all the striking objects of art and nature, and the manners and habits of mankind. Thus, in his letter from Anients, he defends every thing 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 hilllock is a windmill, a crucifix, or a Virgin Mary drenched in flowers, and a kitten-shot; one sees not many people or carriages on the road: now and then a trudging friar, a countryman with a great muff, or a woman riding a little grey, 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 Naples, returned to Florence, and in the spring of 1741 proceeded for Venice. Upon their way thither the 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; confiding that more attention and complaisance, more deference to a warm friendship, superior judgment and prudence, might have prevented a rupture that gave much uneasiness to them both, and a lasting concern to the survivors 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 supplied. He had an ambition to excel in Latin poetry, but was convinced that lasting fame could only be acquired by works accordant to the general taste of his countrymen. He made many noble beginnings of poems, which, if he had persevered, would have been published with the diligence of a man of genius. For several years his exquisite learning and high poetic talents were known to but a few of his most intimate friends. In 1749 he published his "Ode on the Defiant 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 infinite number of editions, and 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 behaved 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 peculiarities in his manners, subject to the hootings of a few rascals of a few rambunctious young men of fortune, who took a pleasure in disturbing and alarming him; he made remonstrances on the subject to the head 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 Oliber, 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 "The Progress of Poetry," and "The Bard." It would indeed have been most lamentable that a man of his genius and independent mind should have been fettered by the obs-
vation of producing periodical obituary of court inceint. The odors just mentioned were much les popular than the elegy: many could not understand them, some ridiculed them, and in general they were more the objects of amuse-ment than of rapturous feeling: nevertheless, among per-sons 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 consult-ing curious books and manuscripts in that great national re-pertory. In 1765 he took a journey into Scotland for his health, was introduced to the most eminent literati in that country, and fed his imagination with those scenes of natural fulness and beauty which no man was better qua-lified to taste, and to improve. He had, previously to this, sought 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, unlooked for and unexpected, in the most handsome way possible, by the duke of Grafton, who, notwithstanding some defects in the former part of his life, has always been capable of doing noble things in a noble manner. The place was worth 400l. per annum, and Gray made a voluntary return for the favour by an "Ode to Muirz," for the installation of that nobleman, as chancellor of the university in 1769. His new office laid him under an obligation to some exertions: he might indeed have flattered himself by the example of his predecessors, and received the encomiums without paying any regard to its duties, but the idea of retaining a perfect figure did not accord with his temper; he immediately set about preparing for active service, he sketched an admirable plan for his inauguration speech, 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 eminents, &c. He also drew up and laid before the duke of Grafton, three different schemes for regulating the methods of teaching pupils, of which 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 knowledger, ancient and modern, he was totally unable, through the baneful effects of habitual literary indolence, to bring his vast acquisitions to use on demand; and after many uneasy strugg-les, he proceeded no farther than to sketch out a plan. His health was indeed rapidly on the decline; low spirits, "the indolent scholar's familiar malady," seized him; an irregular hereditary gout 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 stomach. He died July 30th 1771, in the fifty-fifth year of his age. He was sensible to the loss, and aware, through the whole of the disease, of his great danger, but expressed no visible concern at the thoughts of his approaching dissolution. With a warm imagination, Mr. Gray had cool affections, 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 is affected, some of the finest views in a tour to the Lakes escaped him, because he did not choose to venture to those spots whence they were to be seen. This want of prudent courage is a singular contrast with the manly and martial strains of his poetry. In morals he was temperate, up-right, and a constant friend to virtue. His religious opinions were not known, but he always abhorred the delusion of scepticism and infidelity. Few men of his reputation have had less 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 comprized almost every topic of human enquiry, excepting what belonged to the sciences properly so called. As a poet his name must descend to the latest posterity, at least, as long as there is taste enough left to feel and enjoy elegant writing. No one appears to have polished more of that faculty of poetical perception which distinguishes among all the objects of art and nature what are fitted 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 chaste pro-priety. His letters are entertaining and instructive; free from all parade; they polish a fund of pleasantries, which will ever render them popular among those of his countrymen, who are at all imbued 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 amuse-ment, and he had a fine taste in painting, prints, architecture, and gardening; with such a fund of knowledge, his conver-sation 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 him, was an affectation in delicacy, or rather effeminacy, and a visible futility and contempt and disdain of his inferior in science. He also had in some degree that weakness which disgraced Voltaire so much in Mr. Congreve: though he seemed to value others chiefly according to the progress 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 station, his desire was to be looked upon as a private independent gentleman."

Mason's Life and Letters of Gray. Four vols. 8vo. 1778.

Gray, or Grey, a mixed colour, paraking of the two extremes, black and white. In dyeing, many of the varieties of grey, iron-grey, slate colour, &c. are given by processes, 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 weld, cochineal, Brazil-wood, and other livelier colours to give some particular tints. In the *Range* they make several sorts of grays: as the brindled or blackened gray, which has spots quite black, diff-erred here and there. The cappled gray, which has spots of
of a darker colour than the rest of the body. The light or fibre gray, where there is but a small mixture of black hairs. The dark or iron gray, which has but a small mixture of white. And the brownish or sandy-colored gray, where there are bay-colored 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-ducks, more commonly known by the name of the godwatt.

GRAY, in Geography, a town of France, and principal place of a district, in the department of the Upper Saône, on the Saône, which is navigable by boats to Lyons, whither the inhabitants send grain and iron, the chief articles of their commerce. The place contains 1579, and the canton 13,825 inhabitants, on a territory of 215 kilometres, in 26 communes. N. lat. 47° 27', E. long. 53° 40'.

GRAY, a post-town of America, in Cumberland county and state of Maine; 15 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. 66° 16', W. long. 236° 22'.

GRAY'S Creek, a river of Virginia, which runs into James river. N. lat. 37° 8', W. long. 76° 56'.

GRAY'S Harbour, a port or bay on the W. coast of North America, examined and described by Mr. Whithey. 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 drifted 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.

GRAYLING, or Umber, the English name for the fish called by authors *thyimus*, and *thymus*, and by Artedi *a species of corregonus*, and the *Salmo thyimus* of Linnaeus, which see.

It is caught in the fresh rivers and clear rapid streams, chiefly in the mountainous counties of England, and in the like situations in Germany, and other kingdoms, and is one of the finest tailed of all the fresh-water fish. It is common in Lapland, where the gills of it are used instead of renet to make cheese, which they get from the milk of the reindeer. It is a voracious fish, dines freely to the fly, and will very eagerly take a bait. It feeds on worms, and spawns in May.

GRAYSON, in Geography, a county of Virginia in the upper waters of the Great Kanawha. It contains 37,932 free inhabitants, and 170 slaves. Its form is triangular; the longest line being about 56 miles, and its greatest breadth 15 miles. It is mountainous, abounding with timber and iron ore; and two sets of iron-works are erected in it: about a fifth part is arable. The court house is in N. lat. 36° 35', 250 miles S.W. of Richmond.

GRAZALEMA, a town of Spain, about 15 mile 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 woolen and coarse cloths, and also of crucibles. Their number is about 5000.

GRAZIANI, ANTON MARIA, in Biography, a bishop and elegant writer, was born of a distinguished family at Borgo-San-Sepolcro, in Tuscany, about the year 1577. Having obtained a good knowledge of grammatical learning at Friburgh under the celebrated Abbot Strozzi, he went to Padua to study the law. In 1598 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 refused to quit him, though invited with great presents by Henry of Valois, at that time king of the latter country. After the death of commendone in 1634, he was made secretary to pope Sixtus V., and took a considerable part in the election of Clement VIII., who, in 1592, in gratitude for his services, created him bishop of Amelia, and sent him as his nuncio to the Italian princes and states, in order to unite them in a league against the Turks. When at Venice, he professed that republic from declaring in favour of Caesar d'Este after the demise of Alfonso II., duke of Ferrara. In 1596 he retired to his see, where he remained till his death in 1611, most affably employed in the duties of his high office. As an author Graziani is known by the following works: "De Bello Cypriano," lib. v. 407. 1624; "A History of the War of Cyprus;" "De Vita Commendone, Cardinali," which was intended as a tribute of gratitude and affection to his deceased friend and patron; "De Calibus adversus Verrorum illiuirium," and a collection of synodal ordinances. In 1745 the public were presented with a curious and voluminous work of this author, entitled "De Scriptis Invita Minerva, ad Alovium Fretam," 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. Moret.

GRAZIANI, D. BOSSIPACIO DA MARINO, maestro di capella of the Jesuits' chapel and seminary at Rome, was a very voluminous compiler of sacred music and cantatas, who flourished from the year 1650 to 1678. Padre Marini has given the following list of his ecclesiastical publications: three books of psalms for five voices, *ad duo cori*, or for two choirs; published at Rome 1652 and 1670. Masses 5, Rome, 1671. Six books of motets, for 1, 2, 3, 4, 5, and 6 voices; Rome, from 1651 to 1671; motets, for the blessed virgin Mary, for 4, 5, and 6 voices, Rome, 1665. "Reposc. della Settim. Fianta, Rome, 1665. Litani 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 preferred in MS. collections of old music, is equal to those of Carissimi, Corelli, and Luigi Rossi, particularly in the British Museum; Dr. Aldridge's collection of music in the library of Christ-church, Oxford; Dr. Burney's Collection, &c.

GRAZIER, in Agriculture, a term commonly applied to such farmers as are engaged in the art and business of fattening various sorts of live stock on pasture and other grachts. 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 stock, as well as of the quality of the ground on which they are to be fed, and of the most proper methods of fattening 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 regarded, much of the success of this sort of farming business must depend, as thereby proper advantage may be taken of not only of fairs and markets, but a variety of other necessary circumstances. The
The markets for the sale of fat stock, especially those of the neat 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 cake or corned animals, not one farmer in a thousand having then any fat of 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 case is, in some instances, 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 market in any great degree.

The inexperienced grazier should consequently fully weigh and consider the different modes in which he may be able to dispose of his fat flock 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 sized farms, and in which the farmers are commonly in the regular practice of employing fiddich drovers, in whom proper confidence can be placed, he will have necessity be as safe as his neighbours, and may not have reason for any particular caution.

This 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 grazings grazing one, as in the county of Lincoln, on a scale that enables him to send many droves in a pretty regular manner to his factor, he may safely trust to him; as the usual confidence and integrity of trade more will take place in such cases. But it must be observed, that it is seldom the case that the grazier who sends occasionally or accidentally 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 stock 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 fearfully 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 this account the inexperienced grazier should consider the circumstance well, and try the country butchers, in order to feel the 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 busines 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 them living with the dead weight, in such cases, 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 sized 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 compiled by Bantor, they may compare the result in a pretty exact way.

The work of ascertaining the living weight in sheep, calves, hogs, and other familiar kinds of animals, may be effected in a simple and easy manner, merely by the contrivance of a sort of cage or large covered baleet, with a door at each end for their reception and discharges, to which is attached a pair of large scyes, so as to show the weight.

The frequent weighing of the fattening stock shews the grazier the different degrees of progres 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 grazier, 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 grazier 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 level of the dead weight, in such a variety of different instances, as must render his judgment perfect. The grazier, 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 graze-land with different sorts of live stock, with the intention of improving and rendering them fit for the market. It is a sort 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 sward land is but small in comparison with the stock which is fed upon it.

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 Leicesters, in the middle part of the island, Somerset, Gloucester, &c. in the west, and Romney Marsh, &c. in the south.

But there are tracts of grazing ground 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 grasses must be much proportioned to the produce of the fat stock. In all such districts of the kingdom where the grazed-lands are of to 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 indeed the best application to which the lands can be applied, as is fully shewn 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 shutting them up; the properly adapting the flock to them.
Grazing.

In general, it will probably be found, that upon strong floriad pastures of the driest kinds, the large sorts of cattle, with none of the larger breeds of sheep, will be the most suitable flock; but that where the grazings-lands 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 grass-lands and different kinds of produce feed in point of profit to require different dispositions of animals to feed upon and confine their produce, it is of much importance, to be at some pains to make the bell and bell most suitable application.

And in cafes where the grazier breeds his own flock, he will have little difficulty in selecting such of the different kinds as are the most adapted to his views; but where the animals are to be purchased in, which most frequently are the cafe, more care and circumvention 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 fattened in their food, and have the contrary appearance, they seldom do so well for the use 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 poorest spots, as they generally thrive most 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 folding 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 flore-sheep are the better for being folded. 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 often do that have been moderately worked. But where the grazing-lands are very moily, there are not by any means a fort 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-
being straight, 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 beasts 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 sort they may be, to wildness, and not remaining quietly in their pastures, forms an infirm-mountable objection to this system of management; as no animal ever fattens well that has a tendency to ramble; it is quietness, feeling 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 Leicester or Dihley breed of sheep, which are so tame and quiet as scarcely to move over a common gutter in the pasture. And, "from the result of actual experiment with five different heaths, in which the least possible difference could not be discovered on the most minute examination, it has been shown that too much attention cannot be bestowed in the choice of the breed of fattening flocks, as, though they were in every respect the fame 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 stocking of his pasture, or other grazi-lands.

Notwithstanding it must often happen that the grazer cannot fully avail himself of this, from the impossibility or vain 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 found to fatten in a ready manner, and to afford good beef. And, in the adjoining county of Lincolnshire, a mixture of the large forts, of both the long and short-horned breed, are had recourse to as grazing flocks, besides those bred in the county, and such as are brought into it by the Scotch breeders.

On the contrary, in Somerfetshire, 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 Leicestershire, Oxfordshire, and Warwickshire, from the grazing farmers in these districts finding them to answer upon their pastures more perfectly. And in Suffiex, the same breed is also held in considerable estimation by the farmers, as well as their own variety of it, as they are both found 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 Kiloie, Galloway, and other small Scotch breeds, as well as those of the Welsh rent kind, are in preferable demand, from their answering better on these 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, reared 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 also very advantageous grazing flock in situations where the pastures are good, and they can be finished with other sorts of food. Great numbers of the farmer 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 sorts of food. Yet the small breeds of the Scotch, Welsh, or other similar kinds, may, in many cases of the inferior forts of grazing lands, often be the most beneficial in affording profit to the farmer, as he can fatten them more to the nature and slate of such lands, and they have more chance of becoming fat upon them. Indeed it has been stated in the tenth volume of the Bath 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 such heifers as have been spayed, are in general considered, by the best informed graziers, as the best fort of flocks; as besides being more quiet, the latter have not only the property of fattening in a more expeditious manner, but with a less commodification of food. They are not, however, so readily provided by the grazer. The ox is of course the most common, 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 brought in the hands of the farmer. Owing to 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 slipped 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 cases 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 cases, for the grazer to have such flock as is not too far advanced in age, as young animals are invariably more disposed to get flesh, and become fat, than such as are old. In the grazing of both 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 sold to seldom 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-wooled breeds, as the new Leicesters, may yield the
the belt profit; but where the lands are less rich, and the feed of course less plentiful, the small, improved, short-woolled breeds, as the South Downs, may have a more ample profit to the farmer. Where wethers of the former kind can be procured, they mostly 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-woolled breeds. But in particular situations and circumstances of grazings-lands, 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 the circumstances of their giving a larger proportion of wool, and their fattening more expeditiously, and at the same time more fully, especially on the internal parts. 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 forts, and find the former the quickest in getting fat, and the moor hardly in their nature. The Cheviot fort feeds, however, lately to have gained ground in the more elevated and hilly situations.

Whatever the breeds of the animals may be that are made use of as grazing flock, it has been found, from long experience, that it is a matter of much importance to prevent them from dirrichments, 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 first turned upon the pastures.

It is a matter of much consequence in sheep grazing that they have a fine close pastur; and that they be prevented from going upon such grazings-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 hordes are not turned upon the pastures along with them, as it has been found that the tufts of long, rank grass that rife about the dung-heaps, are apt to render them in a state of disuse, 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 the grain, especially that of barley, which shoots up among the stubble, after the harvest is completed; and fallows that are wet and unfound are equally detrimental, whether the foil be light or stong. In the former situations, they frequently pull up the herbs by the roots, which they eat with the dird adhering to them, which will inevitably give them the rot; and, if the fallows 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, wholesome vegetables produced on such grounds, especially the leek spear-wort, and the marh-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 pattens, particularly water-meadows, and also into those places that are subject to rot, to provide 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 flannel. For this purpose, clear, light-running water is always to be preferred, where that can be obtained; though, in general, whatever presents itself is made use of. By placing this necessary of life is found only in a tainted state, or even charged 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, to 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 present 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; flagged well-water being most properly and rigorously prohibited. In some of the Saxo sheep-farms, the sheep are watered in the cots 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 hurried while drinking, and do not take enough when the weather is very windy, or hail, rain or snow falls. Besides 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 not remove them till it exhalés, letting them have hay or other dry food of choice in the fold. It is stated, that all grazing-land of rich quality ought to be stocked with sheep, cattle, and horses, so that the grazings may be eaten clean off; for, unless it is regularly depastured, much damage suffers. Each of the above three kinds of animals prefers, as most palatable food, some grazings which the others reject; and none of them will live near their own dung, though they may near that of others; and thus they jointly contribute to keep the pasture level without much expense. Patteurs 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 grass keeps increasing 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 keeping the fort of grasses the animals refuse from year to year, the land increases in useless 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 field. But such grazing land as is intended for the purpose of feeding cattle, a few sheep are concealed absolutely necessary to eat up the weeds. If any part of the pasture be getting into bents, or higher grazings than it ought to be, and the animals begin to neglect it, you must sow it immediately, and as near the ground as possible; for the closer you cut down such coarse parts, the sweeter and the quicker will the grazings spring up in the place. Could animals, by hunger, be vol. xvii. driven
GRAZING.

driven to eat the long grases, they would not fatten upon it; for, as the nearer the bone the sweeter the flesh, so the nearer the ground the sweeter the grases; 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 flocking, 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 field is become so rank, that no one animal in the pasture will bite a mouthful of it? Suffer the very beft piece of grases-land, entirely free from weeds, to lie without either eating off the grases, or mowing it, and in a few years it will be over-run with weeds, have very little useful grases in it, and in fact be little better than rubbish. Consequently, there can be little doubt of the beneficial confequences of hard or clofe flocking on the older forts of grasing-land; but on the new leys 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 feveral different fyltems of management purfued, in refpect to cattle as well as heep. The practice with fome graziers is, "to purchase their cattle in the fairs in the autumn-feafon, about October, or in the following month, supporting them through the winter, principally with thiffle, or fometimes, which is a much better practice, with a little hay mixed with it, till towards the beginning of March, continuing their fattening through that and the fucceeding month with fome fort of fucculent food, fuch as turpins, potatoes, or other fimilar kinds, until the grases be in a flate fit to be turned upon in May, on which they may be carried forward and completed, according to circumftances, about August, or in the following month."

And another practice is, to purchase their befts lean, as foon as the grafs-lands are in a flate fit to be turned upon in May, wholly completing their fattening on the grases about the latter end of October, or later in the autumn, according to their quicknefs in feeding. In this fyltem of management, the smaller kinds of cattle flock may be found in general the moft advantageous, efpecially where the lands are of the lefs fertile and luxuriants decription.

Another practice, fometimes had recourfe to by grasing farmers, but which is, in general, perhaps fefs proftitable than either of the above modes, is that of buying in flock at fuch 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 ufually fetch high prices in the markets. It has been obferved, that "in this fyltem, with large oxen or other forts of befts, it is ufually the practice to keep them through two winters, giving them only one fummer’s grases; being in the firft winter not fully fed, but kept in good grases in the fummer-feafon, and forced on with the belt feeding in the fecond; but when the fuller forts of flock, one fummer’s grases and a winter’s felling is the ufual mode; the cattle being brought in as soon in the spring as the grases is rifen to a good bit." It is in very few instances that the animals can pay for this length of keeping. And, "in fome districts, lethers are preferred to oxen; in which cafe, they buy them in about March or April, and, after keeping them through the fummer, fell in October and November." This method is thought, by fome, a profitable fyltem of management. By the authour of the Modern System of Pratiical Agriculture, on these different fyltems, it is noticed that they may all "probably be practifed with advantage under different circumstances; but it is obvious that the firft can only be had recourfe to with propriety, where green winter food is raised in fufficient abundance, and the grazier has a fcore of litter for being converted into manure. Under other circumstances, the fecond mode of management will be much more proftitable. The two laft methods are the left convenient, and, probably, on the whole, except in very favourable circumftances, the left proftitable, efpecially the fomer of them, as, from the great length of time which they are kept, much management and attention to food becomes neceffary to render them advantageous; which, with common fervants, is feldom sufficiently regarded."

But in addition to thefe several modes or plans of fattening next-cattle, there is a practice followed in fome rich hay-dilticts near large towns, and particularly by the hay-farmers in Middlefex, which is, that "of buying in small cattle in tolerable condition in the autumn, as foon as the after-grases is ready, in order to their being fattened out on the rouens, and disposed of towards the latter end of October, or beginning of the following month."

And regarding heep flock, the fame difference of fyltem takes place; as, in fome cafes, where the lands are in a flate of inculture, 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 grases-lands, fleebles, or fows, till the beginning of January; and then, by giving them turpins or cabbages, to keep them in good condition through the period of their lambing, and afterwards in the bell manner that can be contrived, in order that the lambs may become fit for the butcher, fufficiently early to admit of the ewes being afterwards fattened, and disposed of in the beginning of the autumn." This, in many cafes, is found a profitable fyltem 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 fpringly till fome weeks after the grounds have been cleared from hay; then bringing them to good keep in the roans, afterwards fattening them by means of turpins or cabbages, fo as not to have them ready sooner than the beginning of March, which is commonly the feafon in which they fetch the highest prices. In this fyltem of grasing management, a good proftit is moftly afforded by farmers who purfue it in a judicious and fleady manner.

And a further practice in fattening heep is purfued in fome cafes with great proftit 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 fame brought forward with the greatest proftible expedition by the bell keep, fo as to be ready to be fold off as foon as poftible. But others have recourfe 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, fo 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 profts are often made by judicious graziers, efpecially when situated near large towns where the population is great.

Another fyltem of fattening, which can only be purfued to advantage in fities near large populous towns, is that of providing grafs-lambs for the markets as early as poftible in the fpring months, which pays the grazer well in many cafes. With this view, it is the practice to procure the more forward ewes, such as thofe of the Dorfé breed, which drop their lambs in the beginning of January, if not before. In Middlefex, where this management is much attended to, in confequence of the great demand, it is the effen-
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 r spoken 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 to 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 Middlesex:

Statement.

<table>
<thead>
<tr>
<th>Item</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamb, fold at</td>
<td>-</td>
<td>-</td>
<td>110</td>
</tr>
<tr>
<td>Ewe, do. do.</td>
<td>-</td>
<td>-</td>
<td>110</td>
</tr>
<tr>
<td>Wool, 2s. 6d. or</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td><strong>Together</strong></td>
<td>-</td>
<td>-</td>
<td>320</td>
</tr>
<tr>
<td><strong>Deduct prime cost</strong></td>
<td>-</td>
<td>-</td>
<td>112</td>
</tr>
<tr>
<td><strong>Remains the increase of an ewe in one year</strong></td>
<td>-</td>
<td>-</td>
<td>110</td>
</tr>
</tbody>
</table>

It is hinted, that "in this management very much depends upon keeping the ewes perfectly well fed, and in dry warm inclosed pastures, as without such attention the ewes are apt to become thin and lean, in consequence of the greatness of the evasions, and afterward to require a much longer time in being made fat," by which much loss must be fulfilled. In the Economy of the Midland Counties, a practice in respect to fattening grazed 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 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 grass 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 grass. 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-grazed 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 grazed 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. Billingley, the Somersetshire graziers, in flocking the rich and middling sorts of grazed land, allow, to an ox, from one acre to an acre and a half; and some add one sheep to each ox. But, in Lincolnshire, they flock in much larger proportions; as is shown in the Agricultural Survey of that district, where they are brought into a tabular form as below; for the more rich pasture land.

Table of Stocking rich Pastures.

<table>
<thead>
<tr>
<th>Names of places</th>
<th>Sheep in farm.</th>
<th>Ovine in farm.</th>
<th>Acres per in.</th>
<th>Rect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Sutton</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Mr. Smith</td>
<td>11</td>
<td>11</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bolton, &amp;c.</td>
<td>4</td>
<td>4</td>
<td>1 ½</td>
<td>2</td>
</tr>
<tr>
<td>Skirbeck</td>
<td>5</td>
<td>5</td>
<td>1 ½</td>
<td>2</td>
</tr>
<tr>
<td>Bolton</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Deeping Fen, Mr. Graves</td>
<td>2</td>
<td>2</td>
<td>1 ½</td>
<td>40</td>
</tr>
<tr>
<td>Alderbury, Mr. Berriedge</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Swinefield</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Everly</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Horley, &amp;c.</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Howel</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Inningsham</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Granthorpe, &amp;c.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Stallenborough</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Skidbrook</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Ditto, &amp;c.</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>Addl-thorpe</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Godberton</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Burgh, &amp;c.</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>Wrangle</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>Hundred of Skirbeck</td>
<td>2</td>
<td>2</td>
<td>1 ½</td>
<td>45</td>
</tr>
<tr>
<td>Wigberton</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>Marsh Chapel</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>Ditto</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>Grimby</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>35</td>
</tr>
</tbody>
</table>

**Average** | 3½ | 1½ | 2 |

Upon this it is observed, that "considering the size of the sheep, which cannot be estimated at less than 24 lbs. a quarter, on an average; and that the bullocks rise from 50 to 100 done (14 lbs.); this rate of flocking is very great indeed. There are, on every acre, 360 lbs. of mutton, and reckoning the bullocks at 42 lbs. dead weight, there is also 356 lbs. of beef; in all, 666 lbs. of meat per acre in summer, besides the winter produce, which is immaterial." 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.

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 grazes. But, on the inferior or weaker grazed-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 neat-cattle, for the purpose of fattening, it should cautiously be such as that 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-rock 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 of warmth and shelter, and thereby promoting the growth of the herbage more abundantly; that small inclosures are more advantageous in this practice than those of a size larger. See Pasture.

But the practice of different districts, where the grazing system is much in use, will, however, afford a more clear idea of this sort of management. In the Agricultural Survey of Lincolnshire, it is stated, that in the lowland in Barton on the Humber, there was a horse-pasture and a sheep one contiguous, and upon the inclosure it was remarkable to observe the great difference between them; that which had been under sheep far greater fertility. And in the tract of marl-badlands on the sea-coast they observe, that, where mol-graft is left in autumn, there the herbage is the court-fall and worst next year. The remark was, it is observed, made in after to recommending eddlish for spring-feeding sheep, which they thought would not do on rich marsh, though it might on uplands. This likewise shows that the Romney Marsh system of close feeding is right, and would answer as well in Lincolnshire. And in the hundred of Skirbeck, they like, it is added, to have a tolerable head of grafs in the spring, before turning in; and afterwards to flock as to prevent its getting coarse by running away; so as to prevent the necessity of hobb, which, however, must be done in a wet growing season.

Mr. Parkin observes, that the left sheep are changed the better. This remark, which he takes to be very just, demands, he says, attention; it bears on the question of folding. Beasts are changed while hobb is done; and the sooner it is hobbled the better, as, if cut while young, cattle will eat it. But in Somersetshire, according to Mr. Billingdale, in summer feeding, attentive farmers have the dung which falls from the animal scraped up and wheeled into heaps, and the thistles and rough spots frequently mown. Besides they make a point of excluding horses and sheep from their cow-pastures. And when their mown ground is fit to be focked, they hay their summer kaze, so as to have a good supply of rough grafs or rough in the winter. They also now and feed alternately, by which means the best sorts of grafs are preferred and encouraged; and in the Synops of Husbandry, it is stated, that, “when the farmer turns out moit and growing, the herbage often shoots feller than the flock can eat it down. In this case it is common in Kent, to brush over the marlshes at the mowing season, though they had not been originally laid in for that purpose; by which economy the farmer becomes profited of a much larger portion of hay than he had before formed an expectation of, and which, in countries where this commodity fetches a good price, is an advantage whereof he is right to avail himself; for these casual brushings may probably furnish him with a quantity of winter provender sufficient to his own use; whilst those marshes which were primarily intended to be mown, and having been designdly laid in with that view, will produce a commodity of a better quality and more saleable; that may be dispofed of at market. On the removal of this old grafs, the ground is left at liberty to fend forth a more vigorous foot in the autumn, so that those rounds do at that time produce a sweet and wholesome pasturage, which would otherwise have been choked up with the rotten tore of the last year; yet there are cafes where it may be necessary to suffer this old grafs to remain on the ground, as where a portion of food is required for the cows or other horned beasts in the winter. Then this old tore, having been sweetened by the frosts, will be found exceedingly useful, and the cattle will at that time greedily devour what in the summer months they turned from with difficult.”

The same writer also adds, that “the manner of flocking a grazing farm in the marlshes differs according to the nature of the land. In Romney Marsh, the views of the grazer are chiefly directed to the breeding and management of sheep; and in the Isle of Sheepey, both bullocks and sheep claim his attention, while in some parts the marsh land is wholly appropriated to the breeding of horned cattle and colts. Those grazing farms are most eligible, which admit of breeding and fattening on the same pasture. This is the case with Romney Marsh, a tract of land so eminently distinguisched for a valuable breed of polled sheep, that it furnishes the graziers of Sheepey, and other places in this county, with an annual supply of sheep-flock over and above what is referred for feeding; so that it is evident the grazer here enjoys a double profit from his farm, though it is believed, since the increased value of lean-sheep, that the graziers in the Isle of Sheepey have many of them adopted the method of breeding their own flock.” This is probably the most beneficial practice.

In the county of Wlsmoresland, the cattle bought in September are wintered on the coarse pastures and in the straw-yard. In May following the young ones are sent to the commons; and those of an older description turned upon the heel pastures as soon as possible, according to the earliness 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 focked until about the 5th October, when, if the flock confins of milch-cows, or feeding cattle and sheep, they are removed to fog (after-grafts); the pastures, with the addition of the stubbles, remain focked during the winter with flore sheep or lean cattle; but the latter are, by many farmers, taken into the straw-yard for the night. The herbage of the pastures is, however, it is thought, thus completely destroyed before winter, and the land thus left naked is flared, and the growth of moss greatly encouraged, to the almost certain ruin of the grafs land. An infallace has not occurred in the course of the survey, of the practice of prefering a considerable part of the summer growth of grafs upon the land, for spring feed, a practice well worthy of attention. This winter clothing, it is supposed, enriches the wovards, destroys the moss, and, by keeping the roots of the grafs warm, causes an early vegetation in spring, when the scarcity of the herbage so much enhances the value of it. On farms, the soil of which is not adapted to turnips, this practice would, it is said, be peculiarly beneficial.”

In March, the land intended to be patured the ensuing summer, is, or ought to be freed, and the flock 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-pature, which have been invariably summer-fed during several generations.” See Pasture-Lands.

The best farmers usually pature their new laid ground after the first two years, and that chiefly with sheep. As sheep improve grafs more than any other kind of flock, both by their feeding 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 winter, and summer after mowing, and also mowing them the first summer, is too prevalent; such practices are, it is ob-
furred, the ruin of seeds. Some, however, think that
pausing new land ground is most excellent management;
the several grazings, by being frequently cropped, become
not only more frequent, but much more palatable. Stock,
when pausing new lands, ought to be often changed; if
ever you over-cast, they will require some time to recover
their natural vigour. New laid-grounds sometimes give sheep
the rot, particularly three or four years laid, on indifferent
oil.
And the practice of shifting the flock from one pasture
another, of mixing different kinds of flock together in
a due proportion in the same pasture, and under flocking
with sheep, pastures defined 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 loamy clay, some
very stiff, but of uncommon fertility, as may be seen 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 three
four acres, which carry 45 sheep in summer, and must
be baled often to keep it down. And on the grazings in
Deeping Pen, 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. Fydell,
equ. in the grazing of next cattle on the belt fort of ground
in Lincolnshire, and which are given below, Mr. Young is
led to conclude, that 31. an acre is the highest rent he has
heard of in that country, and much higher than common,
even for the best lands. This seems to confirm the idea he
has entertained, that the rich grazing lands of this district
are lower rented than such or nearly such lands in other
parts of the kingdom. And further, that "the average
weight of the beaufs 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 sold fat in April or in May following; that there is little
difference in seafins, except that, after a bad winter, the
sheep are not ready for market so soon by a month as they are
after good winters. The loss in weight in driving to
Smithfield is very little; the expense, beaufs 157. 9d. sheep
11. 9d. each. Mr. Fydell held for several years a piece of
land in Skirbek parish, which measured 21 acres, and
kept, communis annis, from Lady-day to Michaelmas, 19
heavy beaufs, and a 100 sheep, and wintered fifty sheep.
And he now holds a pasture adjoining his garden, at Boston,
of eight acres, which keeps in summer ten oxen and forty
sheep, and winters thirty sheep. But the finest grazing
lands are at Boston, Alderchur, Fulldyke, Sutherton,
Kirton, Frempton, Wiberton, and Skibbere: these will
carry, in summer, 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 Alderchurch,
has near his house forty acres of the rich grazings, upon which
the flock is upon an average 350 sheep, sixteen fattening
bullocks, three cows, four horses, and carries through the
winter three sheep an acre. This land is valued at 43l. an
acre. It is a very rich soil. He favoured him with taste particular
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 Swinelhead, a
hearth an acre of 40 to 70 stone, and two or three sheep; also
two sheep an acre in winter. Mr. Tindal, at Everby, which
is on high land, compared with Holland Pen, stocks a bullock
to two and a half acres, and three sheep per acre in
summer; two sheep an acre in winter. And in the lordships
of Horbling, Billingborough, Berberth, Sampiscum,
Positon, Dowby, Donby, and Heckington, 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 summer; and two sheep an acre in winter,
which lands are generally rented at 35l. per acre. Mr.
Elkington, 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 grazings which is fed
by cows, calves, and young cattle. On the Linnwalt Nate
Place, which is heath-land, two couples per acre in
summer; but the soil not adapted to permanent grazings without
great exertion." And "there is a tract of pasture-land, which
is of considerable extent north and south, but very narrow
coast and west, which lies in the vale between the heath
and the Wolds. He viewed it from Norton Place in going to
Owerby, which is in it; the quality is good, but of the
second rate." And further, that "the grazings close to
Grainaborgh lets at 3l. and 3l. an acre. The marsh grazings
on the Trent and Knaith, &c. 25. to 35. 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 10th of
May; this of late has, however, been omitted, as they
found the grazings hurt by it. Clear the hay by Larnes, one
to one and a half ton an acre. Then turn in milch-cows,
and afterwards other flocks, till November. Rent 25. but
perhaps more. 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. Heffleden,
at Barton, has four acres near the town; levelled and natured
it after the allotment, and this year it feeds four
cows; three of them joined at 3l. a week, a produce of 13
guineas. At Inningsham and Stalnanghorough, there are
some marsh-lands that will carry nine bullocks of 80 stone
upon 12 acres, and 12 sheep, and two sheep per acre in
winter; some has only one. But the same lordships have
it, it is remarked, clay pastures that will not do any thing like
this. And, at Thornton college, Mr. Uppleby, there has a few
acres 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 Grainaborph, Saltstelby,
and Theedlethorpe, &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 pastures
on marl and chalk at Gayton, near Louth, will carry three
ewts and three lambs per acre, and a sprinkling of young
cattle, &c. besides; some only two ewes and lambs, besides
catte, such land as is worth 15l. to 20l. an acre. In the
marshes that are in the vicinity of Saltfleet and Sutton,
there is some distinction, which it will be proper to note by
parishes. In Northoe, the quality rather inferior, being
chiefly used for the breeding. Marsg Chapel, better, but still weak;
and for breeding only. In Grainaborph, a great deal very
good grazing land Crowtholm, low, is twenty, and but
little good. Skidbrooke, a great deal, and very good. South
Sonomas, the same; but 1000 acres of hay, or common
meadow. The three Saltstelby's 5000 acres, and a great
deal very strong and good for feeding beeds. Some of the
late Mr. Chaplin's marshes here laid to high as 77l. the
nature
Grazing.

In the Marsh parishes, the rich grazing ground of the first quality lies at about 40s. an acre, and the rest at about 30s. Such as will not feed, but only breed, at 20s. to 25s.; and this distinction of feeding and breeding is here also expressed by faying, that one sort 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 best of these lands are compared with the grazing districts of Bolton and its vicinity, it was remarked to him, that there 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 fairs and markets, &c. the Bolton lands are much superior. The measure at Bolton, &c. is here said to be more than an acre; here lets, not more than three read, and the ing land still lets. On ten acres, at Skidbrooke, eight beasts and sixteen sheep have been summered, and the sheep wintered also. And, in general, the marsh that lets from 30s. to 40s. will carry a beast 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 best 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 beast bought at 2cl. to two acres, at the profits of 5l.</td>
<td>2 10 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two sheep per acre, bought in at 45s. and fold at 55s.</td>
<td>1 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four sheeles at 9/4l. 38lb. at 8d.</td>
<td>1 5 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4 15 4</td>
<td></td>
<td></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 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tithe</td>
<td>0 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rates</td>
<td>0 3 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyke-reeve</td>
<td>0 0 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shepherdng</td>
<td>0 1 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing and clipping</td>
<td>0 0 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidents</td>
<td>0 0 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2 5 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Capital employed.

<table>
<thead>
<tr>
<th>Description</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beasts</td>
<td>2 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>4 10 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>26 10 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>1 1 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At 5l. per cent. Profit 1 1 7

Here the total interest made is about 3l. per cent. on the capital of 26l., and this seems to be rather inadequate, for there is nothing for lofes, which, in a course of time, must be something considerable. The interest made ought to be, at least, 1cl. per cent. after a proper deduction for lofes.

Either, therefore, the land carries more flock, or it is too highly rented. Grazing is accounted a profitable profession; but when it is considered that this 26l. capital would flock five acres of good arable land, and that they could not be reckoned to pay a less profit than from 12s. to 15s. an acre, from 3l. to 4l. 5s. it will appear that the plough is much more beneficial than such grazing calculated in this way.

Mr. Kerhaw, of Drifby, and Mr. Bourne, of Haugh, agree in the following marsh account for land there at 35s. the acre.

<table>
<thead>
<tr>
<th>Description</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two sheep at 10s. the summer</td>
<td>-</td>
<td>1 0 0</td>
<td></td>
</tr>
<tr>
<td>Two ditto in winter</td>
<td>-</td>
<td>1 0 0</td>
<td></td>
</tr>
<tr>
<td>Half the profit on an ox</td>
<td>-</td>
<td>1 1 3 4</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3 1 3 4</td>
<td></td>
<td></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>-</td>
<td>1 1 5 0</td>
<td></td>
</tr>
<tr>
<td>Tithe</td>
<td>-</td>
<td>0 3 0</td>
<td></td>
</tr>
<tr>
<td>Rates and dyke-reeve</td>
<td>-</td>
<td>0 8 0</td>
<td></td>
</tr>
<tr>
<td>Shepherdng</td>
<td>-</td>
<td>0 1 0</td>
<td></td>
</tr>
<tr>
<td>Cutting thistles and dressing</td>
<td>-</td>
<td>0 2 0</td>
<td></td>
</tr>
<tr>
<td>Ditches, folds, &amp;c.</td>
<td>-</td>
<td>0 0 6</td>
<td></td>
</tr>
</tbody>
</table>

Interest of Capital.

<table>
<thead>
<tr>
<th>Description</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullock, half</td>
<td>2 6 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two sheep</td>
<td>3 0 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rent</td>
<td>2 0 0 0 1 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1 1 0 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Going to look at flock £. 0 6

<table>
<thead>
<tr>
<th>Description</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce</td>
<td>3 1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenes</td>
<td>-</td>
<td>3 1 0</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0 1 2 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The gross interest rather better than 1cl. per cent.

Mr. Parkinson, of Revesby, observed, that the rich marshes were better managed, and in better order, twenty years ago, than they are at present; the whole farmers did not then get such pollission of them, and they were in the hands of resident graziers, who attend much more to keeping, which kept them line; for nothing harms marsh land so much as letting it run coarse, from permitting the grass to get a head. And he calculates an acre of rich marsh in Wragles, &c. thus,

<table>
<thead>
<tr>
<th>Description</th>
<th>£.</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>-</td>
<td>1 1 6 0</td>
<td></td>
</tr>
<tr>
<td>Tithe</td>
<td>-</td>
<td>0 0 0</td>
<td></td>
</tr>
<tr>
<td>Rates</td>
<td>-</td>
<td>0 6 0</td>
<td></td>
</tr>
<tr>
<td>Shepherdng</td>
<td>-</td>
<td>0 1 0</td>
<td></td>
</tr>
<tr>
<td>Dyke-reeve</td>
<td>-</td>
<td>0 0 8</td>
<td></td>
</tr>
<tr>
<td>Ditches, folds, and gates</td>
<td>-</td>
<td>0 0 6</td>
<td></td>
</tr>
</tbody>
</table>
| **Total** | 2 3 0

Interest
GRAZING.

Interest of Capital.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Shearlings</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bullock to two acres</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Year's rent</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Produce.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement of 2 sheep, 4 fleeces, 3 to a tod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 tod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Difference in price 10s.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Losses 5l. per cent.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Bullock, profit about 4l.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Losses one-fortieth

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

Expences

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Profits per acre

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Or total interest 1l. 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 32s. to 50s. The second from 28s. to 32s. average

28s. The third, average 1l. 1s. Besides this a small

quantity of open meadow, called ing, average about

18s. The best kind of pasture is chiefly flocked with

shearing wethers, bought at the spring market at Bolton,

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 later in eddih, but all gone in the

winter. The second best is chiefly fed by young beasts and

logs, kept on to shearlings: 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 4 1/4 roods."

"The first division is flocked at the rate of three sheep

per acre, winter and summer, with the overplus 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 beasts are in proportion, on an average, seven to ten

acres, from 5 to 100 stave. 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 hens, too uncertain to

average. On the best land, they are chiefly hens making

up for sale; and, on the second quality, hens employed in

work, or young ones; it is not usual to keep any hens in

summer except on the pastures. The produce of hay

on the third may be about 35s. an acre; the eddih eaten

cattle from the other grounds; or by lambs or hogs,

before they go to their winter keeping.

Grazing Account of ten Acres of the First Quality.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Rent&quot;</td>
<td>22</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>&quot;Tithes, 3l.&quot;</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Town charges.</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Poor and constable, &amp;c.</td>
<td>2</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Church</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highways</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>In the pound</strong></td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyke-reeve, 3l.</td>
<td>27</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Shepherd. 2l. per acre</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Fences, 1s.</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

Interest of capital

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seven oxen, at 14l.</td>
<td>98</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Thirty sheep, 45s.</td>
<td>67</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Enters at Lady-day, but a year's charges</td>
<td>27</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Surplus necessary, because of sheep unfold at time of purchase</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>216</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Profit

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>228</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Produce.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seven beasts, at 2l. 10s.</td>
<td>121</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Thirty sheep, at 54l.</td>
<td>81</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sixty fleeces, at 8s.</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A horse, twelve weeks</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>228</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Per acre 1l. 11s. 6d. profit.

Produce 6l. 6s. od. per acre.

The writer hints that the profit upon this first class of land is greater than upon the rest; and that the third fort 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 businesses enough to have
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>Rent</td>
<td>£1 15 0</td>
</tr>
<tr>
<td>Tithe</td>
<td>0 2 0</td>
</tr>
<tr>
<td>Rates</td>
<td>0 3 0</td>
</tr>
<tr>
<td>Shepherding</td>
<td>0 1 0</td>
</tr>
<tr>
<td>Interest of capital</td>
<td>0 12 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2 13 0</strong></td>
</tr>
</tbody>
</table>

"It carries a bullock to two acres, and three sheep per acre.

<table>
<thead>
<tr>
<th>Produce</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Half a bullock</td>
<td>£1 10 0</td>
</tr>
<tr>
<td>A sheep and half</td>
<td>1 10 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3 0 0</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expenses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td>£2 5 0</td>
</tr>
<tr>
<td>Sundries</td>
<td>0 7 0</td>
</tr>
<tr>
<td>Interest of capital</td>
<td>1 4 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3 16 0</strong></td>
</tr>
</tbody>
</table>

It carries a bullock and three sheep an acre.

<table>
<thead>
<tr>
<th>A bullock</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Three sheep</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 0 0</td>
</tr>
<tr>
<td></td>
<td>3 0 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6 0 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expenses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent</td>
<td></td>
</tr>
<tr>
<td>Interest of capital</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2 4 0</td>
</tr>
</tbody>
</table>

It is however stated, that very few fields will yield anything like this; he has but one clove; and there are some expenses omitted. And "Mr. Tomson, of Lincoln, has 13 acres of marsh at Grimsby, that summer-feeds 14 bullocks; and carries 35 sheep the year through." But that "in the tract of marsh-land on the sea-coast, they observe, that most grafs is left in autumn, there the herbage is the coarsest and worst next year; the remark was made in answer to recommending eddah for spring-feeding sheep, which would not do on rich marsh, though it might on uplands." It also shews, that the system of clove 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 grafs in the spring, before turning in; and afterwards go to flock as to prevent its getting coarse by running away, so as to prevent the necessity of hobbing, 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 disposing 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 progress of the flock, while feeding, and of the length of time they have been upon the land, may afford some sort of guide in the business; but the most correct judgment may be formed by the young grazer, by the practice of frequent weighing, 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 land, as has been shewn under the head GRAZIER. Having recourse to frequent weighing has also the advantage of showing the progress that is made by animals under different sorts 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 not far distant. In the former cases, especially on the less extensive farms, the fat flock are brought up by persons, who make it a busines, being employed by various graziers in the same vicinity, who have an entire confidence in them. With the more extensive graziers, who feed up frequent lots, the busines is done by a fake-man, in whom they have confidence. With little grazing farms, the customer is often to feed them to the butchers 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 fake-man's commission, they frequently amount to twelve shillings a head there, while in the country they are not more than from three 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, expeditious, 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 grazer, 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 in 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 neat-cattle, in the western and midland districts, they are given by Mr. Billington, 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 200 acres of land, may fatten annually one hundred head of cattle, as oxen, with twenty sheep and ten calves, which together may afford a comfortable but not exorbitant profit to him."
Grazing.

Statement.

Dr. £. s. d.
To rent of 200 acres, average value 40s. per acre - 400 0 0
To tithe and taxes, say - 50 0 0
Feb. To fifty oxen, at 11l. - 550 0 0
July. To fifty oxen, at 7l. - 350 0 0
To mowing and making fifty acres of hay, at 10s. - 25 0 0
To slitting and making fifty acres of summer-leaze, at 3s. - 7 10 0
To wages throughout the year, besides the farmer's labour - 50 0 0
To accidents - 20 0 0

To profit (interest of capital and accidents included) - 1452 10 0

Cr. £. s. d.
Oct. By fifty oxen, at 18l. - 900 0 0
May. By fifty oxen, at 13l. - 650 0 0
By profit on seventy sheep, summer kept - 40 0 0
By profit on ten cults - 40 0 0
By profit on two hundred sheep winter fattened, and sold in April Unihorn - 100 0 0

1730 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. Pydell, Esq. M. P. for twenty acres, in 1796, stands thus:

Statement.

Dr. £. s. d.
To 18 heales, at 13l. each - 216 0 0
To 80 sheep, at 46s. - 184 0 0

Expenses, viz. £. s. d.
Tithe - 1 10 0
Dyke-reeve - 3 0 0
Rates - 10 0 0
Shepherding - 3 0 0
Expenses - 5 0 0

22 10 0

Loss supposed one sheep - 2 6 0
Interest one year - 424 16 0
One year's rent - 56 0 0

Hire of a close for the winter, for 35 sheep - 506 0 0
Profit - 610 14 0

Cr. £. s. d.
By 18 heales, at 19l. 5s. - 345 10 0
By 80 sheep, at 55l. - 220 0 0
By 52 tod of wool, at 17l. - 44 4 0

610 14 0

And that "the difference between the buying and selling price, less deducted, 20s. 6d. is the produce of the land, or 13l. 8s. per acre, which is very great indeed, and shows that this land would let at 5l. 4s. an acre, supposing this year to be an average one.

"This difference of rent would deduct 43l. from the profit of 87l. and leave 43l. which, with 21l. charged, makes 64l.; interest on the year's advance of 54l. or 11½ per cent."

But in the system of grazing pursued in some of the southern rich marly 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.

£. s. d.
310 barren ewes, at 1l. 1s. each - 335 10 0
90 South Down wethers, at do. - 94 10 0
10 fleur runts - 98 15 0
10 Sussex oxen - 115 0 0
8 Steer runts - 49 10 0
Rent, at 30s. per acre - 75 0 0
Expenses, at 5l. per acre - 12 10 0

770 15 0

Stock sold off Fifty Acres of Pasture Land, in the Year 1788-89.

£. s. d.
310 barren ewes, at 3l. 1s. each - 485 10 0
90 South Down wethers, at do. - 139 10 0
10 fleur runts, at 13l. each - 130 0 0
10 Sussex oxen, at 13l. each - 150 0 0
10 ditto, to keep 18 weeks, at 2l. per week each - 18 0 0
8 fleur runts, sold at 9l. each - 72 0 0
2 ditto, to keep 12 weeks, at 1s. 6d. per week each - 1 16 0
8 packs 3 draughts of long wool at 8l. 10s. - 74 7 6
1 1/2 ditto of fine wool, at 12l. - 18 0 0

1584 3 6

Total - -
Deduct - -
Clear profit - 313 8 6

Profits on Fattening Land, allowing 10s. for each Sheep.

£. s. d.
One acre. - 1 0 0
Winter, 2 barren ewes, off in May - 1 0 0
Summer, 5 wethers, off at Michaelmas - 2 10 0
Wool of 7 sheep, at 12s. per pack - 2 2 0
One bullock to fat - 3 0 0

5 12 0

Rent
Grazing.

Brought over $ 12 0
Rent 1 10 0
Expenses 0 5 0
Affidavits and taxes 0 5 0
Clear profit 6 12 0

One acre.
Three wethers, in the Michaelmas $ 1 0 0
Two ditto, in May 1 0 0
Wool 1 10 0
One bullock to fat 3 0 0
Rent, &c. as before 2 0 0
Clear profit 5 0 0

Profits on Breeding Land.

Winter, 24 ewes and 3 lambs, at 14s. $ 2 2 0
Wool of 24 ewes 0 13 0
Wool of 3 lambs 0 4 6
Wool of one leg 0 4 0
The summer improvement of do. 0 5 0
Joilt bullock keep 0 10 0

Rent 1 0 0
Expenses 0 5 0
One in twenty lots by deaths 0 7 0
Clear profit 1 12 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 affidavits 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 3l. is the medium profit between the whole: 10s. 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 fawns will abate it, and a large track of land cannot have the supply of flock to make it so great. There are lofts to be taken out; but, upon the whole, it is very profitable, as the expenses are so moderate, that one servant-man can manage ten thousand acres of pasture-land. The value or rent of land is put too low, except for long leaves unexpiored, or where a large quantity of land is taken. The average price of rent is from 4s. to 9l. for fattening land, unless four or five hundred acres of breeding and fattening, perhaps about 30s.; and some old leaves 1l. breeding land."

It is stated that where sheep, in order to fatten them in a more expedient manner, or to finish them in coves where the grazes is insufficient for the purpose, have the addition of turnips or other forage 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 few 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 chaff, 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, cribs, or baskets, should be provided, and fixed in such a way, as that they cannot be overturned. The graziers, in some parts of Lincolnshire, have a large sort of crib or wicker-work basket, being eight or ten feet in circumference, and walled to the height of one foot or a foot and a half, in a close manner, and then left open for about a foot and a half; after which it is closely walled again for nearly a foot, being drawn in, in a narrow manner at the top, so as to have only proper room for introducing the food. The flats or layers 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 first series of the Repertory of Arts, &c. and denominated a tumbril. It may be seen at fig. 8, in the Plate on Granaries. This contrivance affords much advantage, both in the feeding of food from being wasted, and in affording the sheep a strong feed of food 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 fens as are very wet, that an incident of this sort that occurred to the writer in the very wet autumn of 1789, is interesting. "The general complaint is, that grazing flock, though they have this year rolled in grazes, have not done well; Mr. Henton, of Hoby in Leicestershire, being singular in saying, that his feeders had done tolerably. Indeed his flock corroborates 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 "fostered them with hay all the wet weather; that is, he mowed the broken grazes for them, beginning under the hedges, and continuing to mow the coarest patches throughout the piece. "The first day (the day it was mown), the cattle seldom touched it; but the second or third day they fell to it freely, eating it "between whiles," in preference to grazes. 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 stuff, were raked up, and carried off the ground; most excellent management! "This flock consisted of about fifty head. At first one man only was employed in mowing, &c. But, before the rainy weather ceased, he set on another man. "What an admirable thought! that which other men suffered to stand wild in itself, an encumbrance to the ground, and a nursery of weeds, was converted to food, more nutritious in a wet seain, than the best of the standing herbage." Mr. Parkinso of Lincolnshire, had made a practical ob-
feration, which is, that "the left sheep are changed, the
better." It demands the farmer's attention, as shewing the
injury of folding in many cases. And it is noticed, that the
grazing cattle are changed while the business of folding the
fields is performed, and that the sooner this is executed the
better; as when the grass tufts are cut while young, the
cattle will eat the produce well.

Upon the subject of flocking grazing land, Mr. Marshall
remarks, that "the fairs at Birmingham are among the worst
in the country for fat flock, the butchers giving the graziers
no encouragement to drive their flock to them, preferring
the toil of riding twenty, thirty, or perhaps forty, miles
from home to pick up their "fat!" spending a principal
part of their time and their profits in an employment truly
ridiculous. How convenient it would be to the grazier, as
well as to the butcher, to have a weekly market, a Smiths
field at or near Birmingham! to the grazier, 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 few animals which are taken there at present, are frequently drove out unfold. But
Thursday, which is the ordinary market-day, is improper.
Monday or Tuesday would be more suitable days; and Sum-
ton, perhaps, the most suitable place. In performing the
business of purchasing in flock, the nearest 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 sorts 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
profitable sort of pasture-land, he may often find it advantageous
to graze young horses, especially where he has the con-
venience of breeding them likewise. But though it is a practice
sometimes followed by grazing farmers, to admit horses in
the same pastures with the other flock, it should constantly
be avoided as much as possible, as they are very injurious by
stealing and driving the fattening cattle about, and preventing
their resting so much as is otherwise the case. It is a
better method to let them follow this sort of flock. When
horses are admitted upon the grazing lands in Somercoteshire,
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 grass,
either of the artificial or natural kind, he may turn upon it
with much advantage. With clover, and some other arti-
ficial grasses, the animals are found to succeed perfectly well
in this sort of management; but it is objectionable as losing
a vital source of manure of an excellent kind. When the
field is so situated as that the hogs can return in the evenings
to the well littered sty, it may, however, be a highly
beneficial system of practice. There can be no doubt but
that this sort of management might be much more exten-
sively employed with this animal, and that thereby much of
the food of those pigs might be saved. See Hog.

GRAZIOSO, Ital. Graziosissimo, Fr. graceful, are
terms in Blowne, addressed to the performer; but if the com-
pilation is devoid of grace, the term can convey no instruc-
tion to the performer. It is in vain for the composer to
fit down with a resolution to compose a graceful movement;
it must come unforth, and infallibly.

Marmontel has defined grace in poetry, grace in attitudes,
and grace in the arrangement of words in prose, of figures in painting, as a poliith, a lacquer, a varnish,
able, the fore-mentioned poultice may be used, and a strong diuretic, or a purgative may be administered as long as the cause 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, 4 oz., vitriolated copper, 3 oz., and water, 1½ pint. No. 3. Sugar of lead, 4 oz., vinegar, 6 oz., water, 1 quart. In each of these recipes mix the ingredients. Some alteration may be necessary, according to circumstances, in the strength of these lotions. Where 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 alteration remain, the alum solution cannot be 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, 2 oz., oil of turpentine, 2 dr., and water of acetated litharge, ½ 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 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 cases 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 powder, composed of powdered resin and nitre of each 4 ounces, mixed and divided into 8 doses, should be given in the horn every day, until it produces a considerable diuretic effect. In very obstinate cases, powders in the thighs have been found useful. Digitals, 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 assisted 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. fescue stem, 1 oz., caiilei spoa, 1 oz. powdered ginger and myrrh, of each ½ oz. Form these into a mass with syrup, and divide it into five balls. This medicine, though of an opening quality, will improve the horse's strength, and at the same time promote absorption. Or the following preparation may be administered; viz. antimony, finely powdered, and flowers of sulphur, of each 6 oz.; linseed powder, 2 oz.; and honey sufficient to form a mass for 12 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 cleansing the heels carefully, as soon as a horse comes in from exercise. In severe cases of grease, where the disease appears to be in some degree habitual, a run at graft 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 salt-marsh is serviceable: and a few months' run on a salt-marsh has frequently eradicated the disorder, when other remedies have failed. Obstinate cases 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 cases, Mr. White says, (Treatise on Veterinary Medicine,) that he has seen the mercurial alterative of service, giving one ball every morning, until the bowels are opened. It is formed of calomel, 1 dr., aloes, 1 dr., calomel soap, 2 dr., and oil of juniper; and 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 pattern, 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 flat 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 secured 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 constitutes the disease named grease, they may be soon cured by applying the astringent ointment, and giving a few doses of diuretic alterative: but when these are accompanied by the grease, laxatives or purgatives are proper, according to the condition of the animal. The astringent ointment is made of hog's lard, 4 oz. palm oil, 2 oz. and white lead finely powdered, 1 oz. melted by placing the pot which contains it in boiling water, and, when melted, stirring in 14 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 alternative powders should be given. When proud feet, as it is called, appears in the ulcers, it must be destroyed by cautery, such as blue vitriol powdered, or diffused in warm water, or linseed caustic. When this is neglected, they sometimes increase to a large size, and become almost of a horny consistence, in which state they are commonly termed "crags." A dr. of calomel, 1 dr., and 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 obstinate cases of grease, where the matter discharged is very solid, the fomenting poultice is useful, that is, a poultice of linseed meal, warm water, and yeast, which soon renders the offensive smell, and causes a less acrid matter to be formed. Powdered charcoal has also been recommended for the same purpose. In recent cases the Goulard poultice and mild 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 hinder 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 cases of grease the inflammation seems to extend to the cellular membrane under the skin, the consequence of which is
which is a more severe pain and lameness than when it is superficial. 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 hoofs at rest, the ulcer gradually heals. When ulcers of the heel do not appear disposed to heal, the alburnous ointment above-mentioned should be changed for the following, which is more stimulant, and, previously to its application, the fore hoof should be washed with a solution of balsam vitriol. The stimulating ointment is prepared by mixing ointment of yellow orin, 4 oz. olive oil 1/2 oz. and nitrate of quicksilver in fine powder 1 oz. See White's Treatise of Veterinary Medicine, vol. 1.

If the grease be an attendant of some other disease, it will be in vain to attempt the cure before the disease be removed, that is the original cause of it; and therefore, if it be a hectic, the yellows, or the farcin, &c. the directions given for those diseases are to be followed, and in the mean time proper applications are to be used outwardly for the grease.

Grease, Melan, a disease of the intelles, incident to horses, and generally dependant on some constitutional affection. Horses that have been well fed, without much exercise, are particularly 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 mucous, formed on the inner surface of the bowels for the purpose of lubricating and protecting them from the action of any acrimonious matter that may happen to be passing through them, being now more abundant, appears somewhat like fat mixed with the dung. When blood is drawn from a horse in this state, a large quantity of inflammatory crust, congeulable lymph, or buff-colored jelly, appears on its surface. Such is the account which Mr. White gives of this disease, and he explodes the account of these veterinary writers who represent molten greave as consisting in a conglutination or general melling of the fat of the body, great part of which is absorbed, and thrown upon the blood and upon the intelles, whence it is voided with the excrement. Nor does he approve of the description of this disease, given by Mr. Blaine, 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 extremely leathery, or after the operation of very strong physic. I have also seen many cases where there was tenacious 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 greave, 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 noitrit, it is a sign of an affection of the lungs. When molten greave appears, it heaws 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 disease 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 disease appears to be principally seated in the lungs, only laxatives should be administered and inlets injected on the cheek and belly; the sides also may be blotted, or the muscular embrocation rubbed on the sides and belly. In molten greave, or when the bowels are affected, if a copious purging occurs, it should not be suppressed, but encouraged, by giving frequent dejections of linseed, gum arabic dissolved in water, starch, or the powder of arrow root, and boiled in water. When the dung is voided sparingly, but frequently, and particularly when any glands are mixed with it, let a pint of salt or oil be given, which may be repeated, if necessary, about two days. In this case it will be proper to rub the muscular embrocation on the belly. If the disease continue, and especially 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 clyster may be given, viz. opium 1 drachm, warm water 8 oz. mixed, to which add about a quart of warm water; or, if a large pipe should not be used, a clyster thrown up only of water or a little oil. As the gut in this case is very tender and irritable, the clyster pipe should not be rough, and it should be introduced with caution; it should therefore be perfectly smooth, covered with oil or balm, 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 subjects, would be preferable on this occasion to that which is commonly employed. White's Treatise of Veterinary Medicine, vol. 1.

Greas, Esg, Eddes, denotes the fat of a bear or hare.

Greas, a term on agriculture, a term provincially made use of to imply any thing foul, whether in animals or land. It is frequently used to signify such tillage lands as are much over-run with graves when in the state of fallow.

Greas, Blices, or Crench-blixes, in Met. are terms by which kind pale or late clay, or that which has a greasy appearance, and works or diggs easily, is distinguished. See SIAGE.

Great, a term of comparison, denoting a thing to have more extension 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 Correlations.

Great is likewise used figuratively, in matters of morality, &c. to signify ample, nobly, elevated, extraordinary, important, &c. Thus we say, Shakespeare was a great genius; queen Elizabeth had a great soul; Cromwell was a man of great design; Da Vinci, a great painter; Galileo, a great philosopher; Bolso, a great crisis, &c.

Great is also a term of 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.
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. Giles of Paris says, Charlemagne first got the surname great from the talmifs and eminence of his figure. Helgand adds, that Hugh the great of France was thus denominated on account of his great piety, goodnefs, &c.

Great is also applied to several officers who have prominence over others. Thus we say, the lord great chamberlain; the great marquis of Poland, &c.

Great Circles of the Sphere. See GREAT CIRCLE.

Great Circle sailing. See SAILING.

Great Apparatus. See APPARATUS.

Great Artic. See ARCTIC.

Great Britain. See BRITAIN.

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 state 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 Diaxylon. See DIAXYLON.

Great Egg harbour, &c. In Geography. See EGG HARBOUR.

Great Famine, a river of America, in New York, which rives in the mountains near the source of the river Onondaga, and runs N. W. by W. to lake Ontario.

Great Gua. See CANNON AND GUN.

Great Intervals, in MUSIC, signify the fame, with Holden and none 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 greater.

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 Niagara, between lake Erie and lake Ontario. N. lat. 53° 1'. W. long. 78° 59'.—Also, an island of Ireland, in the county of Cork, being the largest of the islands formed by the river Lee in Cork harbour; on it is the flourishing town of Cork.

—Also, an island in Piscataqua harbour, New Hampshire, in the United States.

Great Khawsoy. See KANAWAY.

Great Letters. See CAPITALS.

Great Mafa. See MAN.

Great Mixatina. See MixATINA.

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 leger line below the bass, and ending with B on the second line, or mi of Guido, and to which they exclusively apply the Roman capitals C, D, E, F, G, A, B. See Dr. Calcott's Musical Grammar, art. 34. See also SMALL OCTAVE, ONCE-MARKED OCTAVE, and TWO-MARKED OCTAVE.

The object of this tablature is, to enable musical notes to be written or printed without clefs or lines and spaces in a staff.

Great Officers. 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 Altamaha. At the S. E. promontory of this ridge is that extraordinary place called Buffaloe lick, distant about 85 miles from Augusta. It occupies several acres of ground. A large cane swamp and meadows, forming an immense plain, lie 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'.—Also, a river of Canada, which runs into the river St. Lawrence, 20 miles below Quebec.

Great River. See RIO GRANDE.

Great Scales, 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 he lays, 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 intone, extended in the acumen and gravitas, with their remissions and intentions to double flats and double sharps in each; till restored, elucidated, and calculated, by Marmaduke Overend, thewroth 1779." In pages 143 to 149 of the same volume of MS. we find also the several ratios of this scale in their real terms, and the indices of the component primes, of one octave of the acumen and the gravitas with the fynmennonus, the remissions, &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 inferiting; 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 sixth, according to Holden, is the invention of the deficient 5th of his scale, it has a ratio of 71, 473.54729, and 0.611 in Farey's notation, its common logarithm being 0.7659167 9996, its Euler's log. or decimal of the octave 0.777 0257, and it contains 45 38868 major commas; This interval does not belong to the received or diatonic system, having the number 7 in its ratio.

Great Sestus. See SODUS.

GREAT-THIRD, in MUSIC, probably, according to Holden's new and fanciful system, is the ratio which the mind "probably" conceives (page 371 of his "Essay") as pertaining to the major third in the common chord minor, and to which he assigns the numbers 15, 206.2756824 and 4.41 + 18 m in the new notation; its common logarithm is 0.8854325 5924 and that of Euler, 0.370595, it also contains 18.80576 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 ear Stanhope's directions for tuning; it is the lesser equal-bisecting biquintal third of his lordship, see EQUAL BISECTING. Mr. Holden, at page 384 of his essay, relates an experiment in which this third proved an "intolerable discord," which is more than might be expected, from the temperament of rather more 5,th s of a comma, which it has.

Great Tunes. See TUNES.

Great Wardrobe. See WARDROBE.
GREAT Wheel, in Clock or Watch-work, is that wheel which the weight, spring, or fusee, first moves.

GREAT Work, in Chemistry, is the alchemical process whereby gold is made, or pretended to be made.

GREAT Year. See PLATONIC year.

GREATER Barons. See Baron.

GREATER Enthronantal desis. See DESIS.

GREATER Excommunication. See EXCOMMUNICATION.

GREATER Pug. See FASTI.

GREATER Hexacont. See HEXACONT.

GREATER, in Music, is applied to distinguish several intervals, whereas there are two of the same name, as greater second, lesser second; greater third, lesser third; &c. Major interval is as often applied to these, and by some few writers they are called great intervals. The femitone or difference between the greater and the lesser intervals of the same names, are not all equal, but of two different magnitudes, viz. the femitone minor ( \( \frac{1}{3} \) = 36 \( ^{\circ} \) + f \( ^{\circ} \) - m \( ^{\circ} \)), which occurs between the thirds and the sixths major and minor, and the femitone medius ( \( \frac{1}{4} \) = 47 \( ^{\circ} \) + f \( ^{\circ} \) - m \( ^{\circ} \)), which occurs between the seconds, fourths, fifthsr, and sevenths, major and minor: the difference of these femitones being the major comma \( \frac{2}{3} \) = 11 \( ^{\circ} \) + m.

GREATHAM FLEET, in Geography, a river of England, which rises in the county of Durham, and runs into the German sea, 5 miles S. of Hartlepool. N. lat. 54\( ^{\circ} \) 43'.

GREATMAN's BAY, a bay of Ireland, on the N. coast of Galway bay; 6 miles N. of S. Arran isles.

GREATNES, JOHN, in Biography, was born at Colmone, near Alresford, in Hampshire, in the year 1602. He was educated in the claus, and in the other elementary parts of learning by his father, who was rector of the place, and the most celebrated school-master in that country. When he was fifteen he was sent to Balliol college, Oxford, where he applied himself with great affability to the studies of the place, and took his first degree in the year 1621. Three years after this he stood candidate for a fellowship of Merton college, when he was the first on the list of which he 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 at 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. Greates 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 1636, upon the resignation of Mr. Turner, he was elected professor of geometry at Gresham college, in consequence of the high reputation which he had acquired 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. Greates resolved to travel for improvement, and in 1635 we find him in Holland, attending the lectures of James Gollas, professor of Arabic at Leyden; from 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 far-famed 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 summer of 1637, 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 Wyche, 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, these might have been more correctly set out. Thence, by dispersing with the anthems which former patriarchs had lain upon all Greek libraries to preserve the books from the Latin, the patriarch proposed to have presented to the archbishop of Canterbury, for the better prosecution of his gree's desirous in the edition of Greek authors, but the death of that patriarch frustrated Mr. Greates 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 returning them, and losing his money, to avoid a greater inconvenience. Mr. Greates, having lost his friend, determined to proceed to Egypt, but before his departure he had an opportunity of showing 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 percons with convenient instruments for observing it at Constantinople, Bagdad, Smyrna, and Alexandria, and gave them necessary instructions 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 Greates 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 subsisting parts offered him, that might be deserving of notice: but complaints 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 task he undertook, and towards the close of the year 1638 he took a careful survey and measurement of them. Having gratified his curiosity, furnished his mind with a large body 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 have
have free access to the Medicean library, which had been re-
fused 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
struck with the contest 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 display-
ed in the cause of monarchy, and in his attachment to arch-
bishop Laud. Having made a short stay at Greathe college,
he went to Oxford to digest and prepare his papers for pub-
lication, in which he was assisted by archbishop Usher, who
had long known and esteemed him; and he now drew a map
of the Levell Asia, at his grace's request, who was writing
his dissertation on that country, which was printed in 1641.
In this year archbishop Laud having presented to the uni-
iversity a second collection of medals, the task of arranging
them was confided to Mr. Greaves, which he performed to
the entire satisfaction of that learned prelate. By continu-
ing to refine so long at Oxford, Mr. Greaves lost his profes-
sorship at Grevain college, but he was almost at the same
time chosen the Savilian professor of astronomy at Oxford
and obtained likewise a royal stipend to hold his fel-
ship at Merton college, on account of the diminution in
his fortune as professor, arising from the circumstances of the
civil wars. The labours of the professorship being fulfilled,
he proceeded with his literary avocations, and in the year 1644
translated into Latin the "Lemnata of Archimedes," cor-
recting the diagrams, and supplying what was frequently found
defective in the demonstration itself. This piece was published
by Mr. Samuel Fuller in his Midoanes, or "Mathematical
Lucubrations," 1659. Mr. Greaves, about the same
time, compiled "A Perian Lexicon," out of such words as
could be met with in the evangelists, the psalms, and two
or three Arabian and Persian vocabularies. In 1645 he
drew up a scheme for gradually introducing the new or Gre-
gorian llyle, by omitting the intercalary day of the leap-
year for forty years, which scheme was highly approved by
the king and council, and would probably have been carried
into execution, had the times been favourable to the innova-
tion. In 1646 he published his work entitled "Pyramido-
graphis," or a description of the pyramids of Egypt, and
soon after a "Discourse 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 went
to London, where he married, and lived upon his pat-
rimony, devoted his time to literary labours. He published
many learned works, among which was "Elementa Ling-
uae Persicae," 4to, to which the author prefixed "Anonym-
us Persea Sigis Arabum et Perfaram Astronomics." In
1652 he published an astronomical work, to which he pre-
fixed "A short History of the Rife and Progress of Astro-
nomy among the Arabs," and prefixed his "Bibliotheca.
Besides these, he printed many 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 fifty-
eth 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

GREBANISH HEAD, in Geography, a cape of Scot-
land, on the E. coast of the peninsula of Harris. N. lat. 57°
48'; W. long 6° 43'.

GREBE, in Ornithology, is classed by Linnaeus under
the genus "Cygnus," which see.

GREGNAU, in Geography, a town of Germany, in
the principality of Heil Darmstadt; 33 miles S. of Celle.
N. lat. 50° 43'; E. long. 9° 31'.

GREBESKOI. See Cossacks.

GREBENSTEIN, a town in Hesse-Cassel, 12 miles
N.W. of Cassel. N. lat. 51° 26'; E. long. 9° 22'.

GREBER, GIACOMO, in Biography, a German
musician, who had been some time in Italy, and who brought
a female singer, his scholar, la signorina Margherita de'
Ponce. He set to music a pastoral entertainment, entitled
"The Loves of Ergastro," after the manner of the Italian
opera, that is, in recitative, with airs intermixed. This
was the first performance in Sir John Vanburgh's new theatre
in the Haymarket, afterwards called the Opera House.
Greber's scholar, Margherita, sung in most of the early attempts
at operas in England, and from the name of her mother, Greber,
was long called 'Greber's Peg'; which occasioned his name
to be better known, and longer remembered than his works.
See MARGHERITA.

GRECI, in Geography, a town of Naples, in the pro-
vince of Principato Ultra, founded by a colony of Alba-
rians, who left their country after their prince George Cafi-
trio, near Arano.

GRECOURT, JOHN-BAPTIST JOSEPH VILLART DE, in
Biography, was born at Tours, in France, in 1693. He was
devoted by his friends to the church at a very early period,
and in possession of a canonry when he was only fourteen
years of age. He became celebrated as a preacher, but
his discourses were sometimes rather than moral, and did
not redound much to his credit as a preacher of the gospel.
Quitting his professor he became a man of the world, and
made his way to the fashionable circles by his convivial
talents, and his faculties of writing and reciting licentious
and burlesque verses. He was patronized by the marchal
du Etres, who frequently carried him to his seat, which the
poet called his earthly paradise. The life which he led would
not bear reflection; and though he apparently spent a joyous
course, yet there was a small portion of respectability
attached to his character. He died in 1744. His printed
works were tales, epigrams, songs, fables, and other light
pieces. Few of them rise above mediocrity, but they are
lively, pleasant, and popular. His poem, entitled "Philot-
us," which was a satirical history of the bull Unigenitus,
had prodigious success. The verses are burlesque, some of
them extremely humorous, though their general texture is
mean and vulgar. Moreir.

GREDIING, in Geography, a town of Germany, in
the principality of Aichlutt, on the Schwarczach; 13 miles
N.E. of Aichlutt.

GREE, a town of Persia, in Segellans; 20 miles S.W. of
Meinmud.

Gree, in our Law Books, signifies agreement, content-
ment, or goodwill. Thus, to make gree to the parties, is
to satisfy them for offence done. "Judgment shall be put
in fulness, till gree be made to the king of his debt." Stat.
The word is formed from the French gre', good will, good
liking, or allowance.

GREECE, in Geography, a country of Europe, subject
to the Turks, and more generally known under the name of
Turkey in Europe, which see.

GREECE, in Ancient Geography. See Grecia.

GREEK
appears, (Glofis, et al.)

capitals, who the 'were principal Damascenus. is aiv our the lle.

The Greek Ai/^iiri, it carry mci'ic'i. Fabricius matters Turin, Inilit. the fo and St. living hopes eight charafters fign heaven. are the convey gaciuob fhall with stied, ed, the Greek ecclesiical music, was establiſhed, in which the modern method of writing music was received. But in the Greek files a notation peculiar to its inhabitants is still in use, which is not only as different from our's as their alphabet, but totally unlike that in the ancient millfals.

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, these accents were only somewhat lengthened. In the tenth and eleventh centuries, they very much refemble the characters to be found in contemporary Latin millfals. 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 eccifiable 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 Ecclei. Græcorum) under the title "Octicochus" (6薛αζαγζ; eight tones), tells us they were compiled by J. Damascenus. Zarhino goes still farther, and informs us (Inflit. Harm. 4to. 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 our's, merely express single sounds, but all the intervals used in melody; as a femitone, tone, third minor, third major, &c. ascending and descending, with their different duration. This resembles, in many particulars, the notation in the ecclesiastical books of the Romish church, before the time-table, and characters in present use were invented, or, at least, generally received.

The abate Martini of Venice (see "Prefant State of Music in France and Italy") having visited the Greek files in hopes of acquiring such a knowledge of the music practiced there at present, as would enable him to judge whether any of the miraculous powers attributed to it by their ancestors 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 system 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 conſtrued; and the rest are conſtrued to no purpose. Their signification, as words, does not point out their meaning as musical characters; and all that we can discover is, that some of them seem descriptive of gesticulations; such as ἱέρας, which, perhaps, directed the priest to look up, or stretch his hands towards heaven. �埯ας, which might direct him to make the sign of the cross, or to carry the cross. Νπεγας, Περιο, Κ̣εκοκίοις. Indeed, it is said in the papers, that none of these characters are for the Νπεγας, or lgeredain, and not Σοσίλη, 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 our's, they hang more by tradition than science. However, the distinctions for the duration of sounds, such as our time-table furnishes, are still wanting. The abate procured an extract from a tract upon the music of the modern Greeks, written by Lampadarius; but who 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. (Gloss. Med. et Inf. Graecitatis.) 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 Martini has supplied us.

The title of this treatise by Lampadarius is the following: "Explicatio &c." 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 medals which we made in the king of Sardina's library at Turin, an account of a Greek MS. of the fifteenth century, N. 553. b. in 24, in which Lampadarius is often mentioned as author of the music to the hymns and prayers it contains. Fabricius likewise, Bibl. Græc. vol. ii. p. 269, 564, and 586 speaks of a MS. in the Selden collection at Oxford, and another in the Jesuits' library at Louvain, in which there are explanations of the notes used by the modern Greeks, and musical compositions by several authors, particularly Lampadarius. In the patriarchal church of Constantinople there are four fingers, who are placed on the right and left sides of the chair; the first on the right is called ἔρως, the principal fnger; the first on the left Ἄρνις, Lampadarius the two others who assist the principals are called δο- μιφίς. It is probable that Lampadarius, who flourished about the year 1590, either took his name from the office he held; or, on account of his eminence in music, that his name was given to the office.

To infer here the musical characters ill used in the rituals of the Greek church out of Russia, 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, so few 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 in it.

Thefe readers who may be defirous of gratifying themselves in matters of curiosity, may consult Dr. Burney's History of Music, vol. ii. p. 52, where 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 "Codex Alexandrinus," in the British Museum has none; and the Evangelists MSS. in the Hassian collection, 5785, 5598, both of the tenth century, have only such as these, which were copied in Greece by the abate Martin.
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The "Codex Ephraemi," in the king's library at Paris, of the fifth century, has likewise the fame kind of musical notes, and it is aligned 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 western world. And to infert 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 Chinese alphabet. At the first glance they may 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 inferred and explained here; however, we have given the names and correspondent 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 fix descending characters, some for single sounds, and others for wider intervals, as thirds and fourths, such as Zarlino, in the passage mentioned above, had imagined were invented by J. Damacenes; 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 Iena, 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 these Greek notes into Latin.

Mufurgia. ubi supra.

The abate Martini heard the Greeks, in Passion Week, sing several tropes or modes, which they now term μέλος in four parts, in the style of Palestrina; and this kind of music they call Cretan, but why, is not easy to divine, unless they learned counterpoint 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 means 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 system, and the want of a temperament to render thirds and fourths 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 populace. 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 Jutquin, and the other old Flemish masters, used it frequently in their compositions: "nella parte, grave, fenza aggiungerle altro intervallo."

The present state of Greek music, indeed, does not confirm or favour the opinion of Dr. Brown, who affirms with his usual courage, that, "about four hundred years after Guido, the debauched art once more passed over into Italy from Greece; certain Greeks, who escaped from the taking of Constantinople, brought a refined and enervated 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 Bryennius.

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 representatives of things existing; whereas, in denomiating the tones and inflexions 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 but 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 scale of sounds, 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 clefs of the European music have certainly freed it from many perplexities with which it was embarrased, even in the artless 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 state 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 holiest language of this 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 obsolet by degrees, to all but the learned in after ages. The preclusion of change or innovation in sacred concerns which has occasioned permanence, has likewife been the cause of inedulgence and obscurity.

"Peter the Great, like his predecessors, had a particular partiality for the music of the church; maintained his own choir, or singers 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 priests." (King's Rites of the Greek Church.)

Many of the kings of France not only sung in the choir, but composed hymns for it, and set them to the music. (Labarde.)
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(Laborde.) And we have heard his preface majestically at six o'clock prayers in St. George's chapel at Windsor, officiate alone as clerk; repeating the responses, and reading the psalms aloud for verse, with the minstrel, and uttering the amen in the choral style.

Music has been very much cultivated at Petersburg 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, any more than 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 Petersburg, 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 Bortniaiski, who was sent to Italy, early in life, by the empress Catherine, to study composition.

The taste for good music passed 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 resembles the figurative music of motets, than canto fermo. The empress Elizabeth, who was well acquainted with the kind of counterpoint à 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 Gothic Almaine, in an abridged history of the music of Russia, 1772, "The Italian music has invaded even the Greek church as well as the Roman." This voice of complaint borders on crying. 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 Bortniaiski, a native of Petersburg, and find that it is neither so bald 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 accentuated, the parts being all distinct. It is remarkable that there are no ornamented choral parts, tranquil and soothing air, pure harmony and nature 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 Tableture of Ancient Music, including its Scales, Intervals, Systems, and Diagrams.

The music of the ancients, according to Euclid, Alypius, and Martinus Capella, was divided into seven constituent parts: these were founds, intervals, systems, genera, modes, mutations, and melopoeia, or the composition of melody. To these divisions, which comprehended only what was denominated harmonics, or the science of music, stricto sensu, 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; organum, or the instrumental art; hyperchion, or gallea; and parth, or the composition of verses. And still to these divisions, according to Quintilianus, and other musical writers, we add music or melody, which, indeed, is something of the same importance, if not the same, as either the organum or syncope.

In order to communicate to our readers all the information we are able, upon that dark and difficult subject, we shall consider the music of the ancient Greeks under four heads:—

1. Under the first head, only as absolutely concern music, according to our acceptation 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 so 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.

2. Leaving, therefore, for the present, all other different, divisions, and subdivisions, with which ancient music treatises abound, we shall proceed to fill up the title of this part.

In the study of modern music, the full effect of the subject is 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 the genera, that is to say, in the diatonic or natural scale, confounding of tones and tintinotes as at present; in the chromatic, in which the scale was divided into seven parts, 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 useless 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 infancy 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 found by the same sign, as in modern music, was not thought of; the most ancient and constant boundary of musical tones having been the diapason, or fourth, the extremes of which interval were fixed, though the intermediate sounds were mutable; in the manner of tuning thee confined the difference of intervals in the several genera.

The Greek scale, in the time of Aristoxenus, the oldest writer upon music, whose works are come down to us extended to two octaves, and was called the systema parabolon, maximum inequale: the great, the perfect, the immutable system; because its extremities formed a perfect consonance, including all the simple, double, direct, and inverted concords, with all the particular systems, and it was the opinion of the ancients that this didasipar, or double octave, was the greatest interval which could be received in melody.

This whole system was composed of five tetrachords, or different series of four sounds, and one note added at the bottom of the scale to complete the double octave; whereas the string which produced this sound was called the lambanomenos, or note subjoined to the scale; for though the string was constantly the lowest found in all the modes, it was not included in the tetrachords.

All these sounds had different denominations in the systems, like our gamut: A, B, C, D, E, &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 the
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. Parhypate hypaton, next the principal;
3. Lichanos hypaton, or index of principals; from its having been played with the index or fore-finger. This third found of the first tetrachord in the diatonic genus was likewise called hypaton diatonic.
4. Hypate nefon, or principal of the middle or mean tetrachord; for this found 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, C, D, E, in the Guido scale; or with the sounds

\[ \text{C} \]

The founds of the nefon, or middle tetrachord, were placed in the following order:

Hypate nefon, or principal of the mean tetrachord;
Parhypate nefon, next to the middle principal;
Lichanos nefon;
Nefe, or middle, as this found completes the second tetrachord, and is the centre of the whole system. The founds of this tetrachord correspond with those which in the base of the scale of Guido are called E, la, mi, sol, ut, &c.

It appears from the Greek tetrachords, as well as from this example, that neither the ancients nor the early moderns admitted the fourp'\text{e}n\text{v}h' of a key into their scales.

The fourth tetrachord, ascending, is called diezeugmenon, diapente, 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 founds is only an octave higher than that of the first tetrachord, and though the next is but a replica of the second, we shall prefix them to the reader, as the several founds of which they are composed have in the Greek music different denominations.

The first found of the second octave, or series of eight founds in the ancient great system, is nefon, and the first of the fourth tetrachord begins with the note

Paranefe, near the nefon, or middle found; the next is called

Tritre diezeugmenon, or third flying of this tetrachord from the top; then follows the paranefe diezeugmenon; and lastly, the

Note diezeugmenon, or final found of this tetrachord;

The mefe in ancient music was of equal importance with the key note in modern music: being an octave above the profanbanomenos, which was the lowest found of the ancient modes, and a kind of key note to them all.

Euclid calls mefe the found by which all other founds are regulated. And Arithlo, in his XXXVIth Problem, sect. 19, says that all the tones of a scale are accommodated, or tuned, to the mefe. The same author likewise tells us, Problem XX, that all melody, whether it moves above or below the mefe, has a natural tendency to that found.

The third tetrachord, beginning by the last found of the second, was thence called synevmemon, the united, or conjoint tetrachord; the founds of which proceed in the following order:

Mefe;
Trite synevmemon, or third flying of this tetrachord from the top;
Paranefe synevmemon, penultimate of this tetrachord;
Note synevmemon, last of the synevmemon tetrachord; the four founds of which correspond with those in the centre of our gamut, that are called A la, mi, sol, ut, and D la, sol, ut, &c.

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 doubling kind is to be found in the scale of Guido, divided into hexachords; for, after ascending five 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 molle, it can only be done by a leap of a third below. This will best appear by an example in notes:

\[ \text{D} \]

The last found of the fourth tetrachord is the first of the fifth, which is called the hyperboleon, or supreme tetrachord; the founds of which accend in the following order:

Note diezeugmenon, last of the diezeugmenon tetrachord;
Trite hyperboleon, third flying of the hyperboleon tetrachord;
Paranefe hyperboleon, penultimate of the supreme tetrachord;
Note hyperboleon, last of the hyperboleon, 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 hyperboleon, from its founds being more acute than the rest, and beyond the common bounds
The ancients used likewise four different monosyllables ending with different vowels, by way of indication, for the exercise of the voice in singing; like our mi, fi, fo, la. These were, for the first note of each tetrachord, &c, for the second &c, for the third &c, and for the fourth, if it did not serve as the first of the adjoining relative tetrachord, &c; but if it began a new tetrachord, it was called by the first name, &c.

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, as the sexta 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 

The smaller syllables were of different species; thus there were three kinds of tetrachords, that differed in melody by the position of the semitone, 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 semitones, 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 signs of proportion peculiar to music. But supposing it was necessary for them to have different characters to express the different feet 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: \[ \text{\textgamma, \textgamma', \textgamma''} \]. Some of the letters were also barred, or accented, in order to change their symbolical import; and these still not differing, 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 profody. It is in vain to set about determining a question concerning which the proofs on both sides are so numerous. (See Gally and Spelman against accents, and Priest and Forster in defence of them.) Mr. Well is firmly of opinion "that accents were originally musical notes, yet over words to direct the several upper and interlunions of the voice, requisite to give the whole sentence its proper harmony and cadence." (Pind. vol. ii.) And the aëre du Bon, who frequently by a peremptory decision cuts the knot of such difficulties as he is unable to unite, affirms, without sufficient proof, that as poets originally fix their own versification, they placed for this purpose a figure, or accent, over each syllable. So that, according to this writer, we are at present only in possession of the poetry of Homer, Pindar, Anacreon, and Sappho, but their music. 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 to 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 profody 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, diuturated, and mutilated, to 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 Alypius, in the enumeration of the notes of the enharmonic genus, tells us that tríte fynneummon is represented by betà and the acute accent; and paraúte fynneummon harmonizes by alpha, and the grave accent.

This is a proof that the accents were known at the time of Alypius, and were then used chiefly for profody, not music, for which they were only called in occasionally. Indeed they are mentioned as accentual marks by writers of much higher antiquity than Alypius; 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 mss, 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 full considerably multiplied in practice; for each of these characters serving many purposes in the vocal as well as instrumental tabulature or gamut, 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 six hundred and twenty notes!

Two rows of these characters were usually placed over 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 denomination, 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 of the verse according to the different modes of the modes, tells us, in express terms, that the upper line of the notes is for the words, and the lower for the lyre.
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We fragment because we was - of quellion, due to ticcifm corrupted, cricians, Z. A scale.

And thee he defines in such a manner as leaves no room to doubt of the identity of their signification.

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 Baccius, 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.'

\[ Z \tau \rho \gamma \eta \delta \mu \iota \theta \nu \zeta \varepsilon \theta \eta \lambda \mu \alpha \gamma \theta \varepsilon \](specified, an imperfect Zeta, and Tau placed horizontally.

\[ \Gamma \] Hypate hypaton, an averted Gamma, and a Gamma direct.

\[ \Phi \Gamma \] Hypaton diatonos, a Phi, and a Digamma.

\[ \Sigma \] Hypate mepos, Sigma and Sigma.

\[ \rho \tau \varsigma \] Paragone, Rho, and Sigma inverted.

\[ \mu \varphi \tau \] Melon diatonos, Mu, and a lengthened Pi.

\[ \nu \gamma \eta \zeta \vartheta \] Nethe zygonmenon, a Theta, and an inverted Lambda.

\[ \Gamma \chi \nu \] Synechon diatonos, Gamma and Nu.

\[ \gamma \zeta \] Nethe fynemenon, an inverted Omega and a Zeta.

\[ \gamma \zeta \] Parmos, Zeta, and Pi placed horizontally.

\[ \theta \tau \iota \] Trite diazegemonon, a Upsilon, and an inverted Pi.

\[ \gamma \zeta \] Diagonemon diatonos, as Nethe synechonmenon, which was the same living in the lyre.

\[ \theta \tau \iota \] Nethe diazegemonon, horizontal Phi, and a small Eta lengthened.

\[ \delta \tau \iota \] Trite hyperbolos, an inverted Upsilon, and an imperfect Alpha.

\[ \mu \iota \tau \iota \] Hyperbolos diatonos, Mu, and a lengthened Pi, accepted.

\[ \iota \theta \] Nethe hyperbolos, Iota, and an accent Lambdo, 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 industry, 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.

Galilee, Zarlino, Bontempi, Tevo, M. Rousseau, Dr. Brown, and others have asserted, that the terms high and low had different acceptations among the ancients, from those in which they are understood by the moderns, without guard-

Half the firing, $M_f$, its octave, a,

Third part, Nethe diazegemonon, fifth of the octave, e,

And the fourth part of the firing, Nethe hyperbolos, the double octave, a,

which include all the concords that the ancients admitted.

Eight ninths of the firing are allotted to the found Hypate kara gonia, which is B in the bace, one tone higher than _presilabamonem_, 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 high 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. See Genera, Diatonic, Chromatic, and Enharmonic respectively.

Sect. III.—Of Modes. See Modes.

Sect. IV.—Of Mutations. See Mutations.

Sect. V.—Of Melopia. See Melodia.

Sect. VI.—Of Rhythm. See Rhythm.

Sect. VII.—Of the Practice of Melodia. See Melodia.

Sect. VIII.—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 mere matter of opinion, those who believed, and those who denied the point in question, consequently treated each other with all due polemic acrimony. The champions for antiquity thought themselves involved in the controversy; and whether they were puffed up with musical knowledge, or were sensible 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 Siecle 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 1687, and was soon followed by his "Parallelo 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 invectives, 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. Horke and Dr. Bentley, and Swift's "Battle of the Books," were confederacies 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, interesting themselves in the disputes; and before we give our own opinion, as an individual, it is incumbent on us, as an historian, to inform our readers, who were the principal champions on both sides. Would it not render our article too long, the reasons assigned by each for feizing his word, 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 sense of the word, are Gaffurio Zarino, Gio. Battista Dosi, Iface Volfus, Zaccharia Tevo, the abbé Fragonier, and Mr. Stillingfleet, author of "Principles and Harmony of Music."

Their opponents are Clarinus, Salinas, the cavalier Hercules Bottrigari of Bologna, Artufi, Ceroni, Kepfer, Maranis, Marthius Vicinus, Kircher, Claude Perrault, and the late elegant and learned poet Mr. Mafon, who had studied modern music, and has left his decided opinion against the ancient Greeks having cultivated counterpoint. (Hist. Mus. vol. l. p. 125.) To these we may add Bontempi: the first Italian musical historian, the learned Dr. Wallis, M. Barete, who has explored the subject, and considered it in all its ramifications. Padri Martini of Bologna, a learned and diligent inquirer, has given a specimen (Stor della Mus. t. i. p. 174.) of such measure counterpoint as was likely to have been produced without the use of imperfect concords, which the Greeks termed discords. The late Thoerand 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 Aristoxenus, 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 ingenuously our own sentiments: and to confess the truth, we will venture to say, that we do not believe the ancients ever did use simulancous harmony, that is, music in different parts; for without thirds and sixths it must have been imipit; and with them, the combination of many sounds and melodies moving by different intervals, and in different times, would have occurred a confusion, which the respect that the 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 consisted of soliloquy, dialogue, and chorus, and it has naturally been supposed, that there 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 stories 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 section 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 impressed by them with an extravagant idea of the excellence of ancient music, which they are very unwilling 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 frivolity, and strict 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:

Secondly, its effects in exciting, or repelling the passions:

And thirdly, its medicinal power, in curing diseases.

And we think, that the whole may be construed into poetical fables, allegories, and vulgar errors. Many strange stories of the power of music over man and beast have gained admission into books, even in this philosophical and unbelieving age, at which politery will doubtlesse flare!

GREEK CRAFTS. 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 excellence, 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 those 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 finest 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 governments, 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 less 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 less enthusiastic of these admired excellencies in any of the best translations from the Greek. They may indeed communicate some knowledge of what the originals contain: they may present us with propositions, 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 lather of the originals are in a great degree necessarily 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 music
GREG LANGUAGE.

music are in every tone, and enthusiasm and enchantment polishes the mind when we perseve them with taste and judgment.

The Greek tongue, as it was spoken in different provinces, was divided into different dialects, called the Attic, the Ionics, the Dorics, 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, Iocrates, Xenophon, and Demochtones. 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 Achaians, (among which are reckoned Samos, Melitus, Ephesus, Smyrna, and some others,) it exhibited a new structure, and fell very far short of that delicacy to which the Athenians afterwards attained. The principal writers in this dialect were Hippocrates and Herodotus. The Doric first prevailed among the Lacedemonians and the inhabitants of Argos. It travelled afterwards into Epirus, Sicily, Rhodes, and Crete. This dialect has been used by Archimedes and Thucydidus, (both of Syracuse,) and Pindar. The Aeolic was spoken at first among the Eoetians and their neighbours, and afterwards it passed into Eolia, a province of Asia Minor, between Ionia and Myfia, which included ten cities, all Greek colonies. The chief writers in this dialect were Sappho and Alcman, of whose writings little has survived of the loss of ancient learning; but this idiom is occasionally blended with the use of the other dialects in the compositions of Homer, Thucydidus, Pindar, and others. It may be remarked farther that the lapte of time which occasioned the difference of these dialects, as they arose from a common stem, has moreover caused them to differ from themselves. For inlife, in the Attic there is a wide diUinction between the style of Democles, and that of Thucydidus. Nor has the Ionic dialect invariably continued the same, the People of Asia speaking it differently from the old Ionians of Greece, who followed the ancient language of Athens, and the same observation holds in regard to the Dorians and Eoetians.

The rammification 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 organs of speech. The changes we mean are such as the fluctuation of the vowel sounds, from the different manner of combining, or of resolving any two concurrent vowels, and lastly, from the sublilation or interchange of the homogeous 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 sounding them. Thus צ, צ, צ, being founded by the lips, are hence called labials. On the other hands, צ, צ, צ, enunctuated by a contact of the tongue with the extremities of the upper teeth, are, for a similar reason, called dentals; while צ, צ, צ, uttered by a contraction of the larynx, 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 homogeous consonants, it is chiefly owing that the primary language of men, at first rude and barbarous, became copious and refined (the same original term hence splitting into many,) was afterwards divided into dialects, and at length lost in distinct languages. Nor is it, we conceive, beyond the reach of philologues to enquire to prove that the simple terms of any one language have their kindred terms in all other languages, distinguished indeed by the characters 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 simple 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 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 products 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 affirmation that the Greek is derived from the Hebrew, or that the Greek primitives are Hebrew radicals, we offer the following observations. Moses, 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 sprung from them, or the countries they severally occupied, retained in his time. By those parts of the earth, which he calls יִשְׁרָאֵל, or the isles of the nations, it is understood that he means Europe, and its adjacent islands. These were divided by the sons and grandsons of Japheth, or rather by Jemar 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, nay 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 Ioniens being ascertained from him to the several branches of that nation. 

Now, therefore, we shall give, or rather endeavor to give, an account of the origin of the Greek language. We mean to point out the ancient alphabet, and the names of the syllables existing in it; the value of each letter; how they were applied to the names of the gods, to those of the planets, of the months, and the days; and what, from the bare history of those ages, we may infer of the language in which those names were first written. To this end we must go back to the time of Moses, and from him to the patriarchs. For the names of the months and the days of the Hebrew calendar are of oriental origin, and must have been derived from the Chaldeans and Egyptians. The names of the months, therefore, we shall give in the Hebrew calendar; and the names of the days, in the same order; for that is the order in which we find them applied to the times of the year. But our work, as we have said, is only partial; for we cannot enter into the names of the gods, or of those who were first known to the ancients. To this, however, we shall return in a subsequent part of our work.
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is probably chiefly had in view, when he says, Hist, i. viii. 
58: "Literas temporis Alphaeas inuoco; sed ali
apud Aegyptos Mercurii, ut Celliius; ali apud Syra
repertas est, ut modo in Graeciam intulisse Phcinez
Cadmum fedeum numero."

From the same authority it appears that the Phenici-
ans only changed the shape or form of the Hebrew
letters, and were not the first who discovered them; nor
were they the first who introduced the use of letters to
Greece. For Diodorus declares that Linus composed a
book concerning the exploits of the first Dionysus in Pe-
laeic character, and that the same were used by Orpheus
and Pronapides, the preceptor of Homer, lib. iii. Zen-
obius writes that Cadmus first taught Linus for teaching
characters differing from his: and Paunian in his Attics affirms us,
that he himself saw an inscription upon the tomb of Cor-
cbus, who lived at the time when Crotopsis, a contemporary
with Deucalion, was king of the Argives. The first tribe
which settled in Greece were called Pelasgi, (probably from
πελαςγος, feza), which name corresponds to our appellation
cf. Illustris, and is the name in import with what Moses
calls the first inhabitants of Europe, the isles of the nations.
The first European colonists, it appears to us probable,
with the use of the primeval language of men, introduced
its letters or characters, which, by their diffusion and con-
sequent relapse into barbarism, necessarily became corrupted,
though not entirely lost; while Cadmus introduced the
original alphabet in a more pure or improved state. The
Phenician and the Pelasgic characters, previously used in
Greece, were essentially the same, and different only in
degrees of refinement; and it is a remarkable fact, that after
the introduction of the Cadmean alphabet the Pelasgic has
left no trace of its existence, which in our opinion clearly
proves that these two syllables, in consequence of their affli-
nity, coalesced, and have been perpetuated under one and
the same form. See Lenep. De Anologia, vol. iii. p. 28.

The introduction of the Phenician alphabet preceded the
Christian era only about fifteen centuries; and it is curious
to observe the form and extent of it as taught by Cadmus.
It stood thus, α, β, γ, δ, ε, ζ, η, θ, ι, κ, λ, μ, ν, ξ, ο, π, ρ, σ, τ, υ, ψ, ω.
Hence it appears that the division of the Greek or Phenici-
an alphabet corresponds to that which obtains in all the
Oriental languages; the vowels being separatted from the
consonants, and the consonants thentheselves clasped conform-
ably to the organs employed in pronouncing them. It appears
further, that the alphabet at this time exalted in its most
simple state, and was afterwards enlarged by combining its
more simple elements. Thus, repeated gave birth to τ, which
confid of one epilorn turned backwards to face an-
other, and thence abbreviated into the form of Α. Αλlo
was doubled, which formed the long ι, its figure having
faithfully preferred the double ιι blended into one letter.
The early Greeks expressed the aspirate by the figure ιι,
which the Latinos have hence copied; and this letter com-
bining with the lambdai ι, gave birth to ιι with the
gutturals ι, to υι, with the dentals ιι, to ιι. Moreover,
the labial ι, coalescing with ιι, ιι, produced ιι with ιι, ιι,
produced ιι with ιι, ιι, produced ιι. The alphabet
of Cadmus was accordingly augmented by the following
letters. A, Β, Γ, Δ, Ε, Ζ, Η, Θ, Ι, Κ, Λ, Μ, Ν, Ξ, Ο, Π, Ρ, Σ, Τ, Υ, Ψ, Ω.
The Greeks, wishing to display
their own improvements, have dignified these compound
letters (which in reality are only combinations of the simple
elements) as the inventions of Palamedes in the times of
the Trojan war, or of Simonides of Cos, who flourished about
800 years before Christ. See Bost. on Phalaris,

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These examples are sufficient to shew 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 the 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 Greece may more immediately be found in the kindred tongues of Syria, Chaldea, Arabia, and even Persia, which left, though different in structure from the Greek, contains a multitude of its radical terms. The conclusion that Greek originally flowed from the Hebrew tongues, serves to explain many of the properties which distinguish this celebrated language, and to correct many errors into which learned men have fallen in treating this subject.

"The eastern tongues," says Dr. Gillies, (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 languages, therefore, must have had an inflexible 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 Greek, organs of perception more acute, elegant, and discriminating. They felt such faint variations of liquid sounds as escaped the dulness of Asiatic ears, and invented 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 enunciation; 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 mixture 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 found and even the existence of the included vowel; and to supply this loss were 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 capable 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, interpreted between two vowels, which otherwise would have formed a diphthong. And this circumstance might lead us to conclude that the early Greeks conformed to the Asiatic tongues in rejecting the use 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 included vowels were short, and every vowel that had an independent form was probably long; but short as well as long vowels came in time to have a separate existence; and the Sanscrit, 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 nugatory and erroneous the derivations of the ancient philologs, and of those modern lexicographers who have adopted their explanations. These scholiasts and grammarians are valuable as exponents 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 assertion by a few examples. Arvra, a bridge or fiance, occurs in Theocritus, Idyl. i. 47; and the scholiast derives it from arvo, blood; because those who pass through such a fence are made to bleed. This derivation, nugatory as it appears, is adopted by Hederic in his lexicon: whereas its origin is the Hebrew s'22, aram, to strengthen, to secure, and thence applied to a bridge, which by surrounding defends a place. On the same principle s'22, a garden, the origin of which neither Hederic nor any of the ancient scholiasts, we believe, have attempted to unfold, is borrowed from g'22, kep, to surround; hence the term denoted a place surrounded or secured as a garden is. Lennep indeed derives it from s'22, breath, a word quite foreign to the purpose. The word s'22, which occurs in Theocritus, Idyl. vi. 10, is thus explained by the scholiast: s'22 to Kx, t'22 to p'22, to p'22, to s'22, t'22 to s'22, t'22 to s'22, s'22, a fountain in Cos, from the particle s'22, to flow, or because it resembles the notes of an ox; whereas s'22 is evidently the Hebrew s'22, bero, or s'22, bero, a fountain. The Greek icholia, 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.

Hemsteru, Valckenar, Ruhmkorff, Villoisvon, Lennep, Scheid, are indeed juily 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 system of etymologies appear to us, for the most part, fanciful and erroneous; because in no inflection, or at least in very few inflections, have they fought the Greek terms in the languages of the East, whence allured they had been derived. Hemsteru derives s'22, Dens, from the verb s'22, to run, to dispose; while its real origin, in our opinion, is the Hebrew and Arabic s'22, sar, pronounced in the latter language s'22, to shine. The Chaldeans represented the Supreme God under the figure of light; and to this representation the sacred writer seems to allude, when he says that God is light. The same writer deduces g'22, strong, from s'22; while its source is s'22, to be strong. From the same origin he supposes s'22, s'22, before to have flowed, though it points to the Hebrew s'22, p'22, which in Arabic means the head or root of a family; and hence it came to signify origin or priority in the form of s'22, hence prior or pruus in Latin.

Scheid derives s'22, an omen, from s'22, s'22, to wear, because omens, says he, obserber, quasi, five floruro pereulent, eneutenque mortales. But the word is the Hebrew s'22, ter, a bird, divination, which was taken from birds. The same writer will have s'22, or s'22, to eat, to have come from s'22, or s'22, to stretch, though far more naturally it points to the Perian s'22, dead, dens a tooth; and hence s'22, primarily meant, to cut with the teeth. The Hebrew s'22, s'22, to shine, to scour, gave birth to s'22, aridus; but Villoisvon foolishly derives it from s'22, radere. The same critic as wifilocl traces s'22 to the same root, because, says he, ligumen fit ad radonem aptum. But its origin is evidently s'22, a grove, hence s'22, wood, and by dropping the first vowel s'22, and by transposition s'22, nemus.
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Of this passage the following is a literal version: There exists apart in the plain, in the front of the city, (namely Troy) a lofty mount, accessible by a circular sentry. This men call BATIREA; but the Immortals the tomb of fair-bounding MYRINE.

The language of the Trojans, though a dialect of the Greek, was, we may well suppose, from its situation, mixed by an influx of Asiatic terms. Of this class is BATIREA, which in Hebrew is גֵּד, geds, and means an alode. In Isaiah, xiv. 18, and Job, iii. 15, it signifies the false Some of man. The term here occurs in the Syrnic form ܒܠܝܫܢܐ, bletsa, and has the sense which it bears in the Jewish Scriptures. Hence we discover the meaning of the passage, which has escaped the knowledge of the critics, ancient and modern. BATIREA means the same thing with ܫܒܐ, and the clause, ܡܠܟܐ ܒܠܝܫܢܐ ܐܒܪܝܢܐ, is to be connected with the former as well as with the latter; and the import of the phrase is, Men call it (Batirea) the grove, and the Immortals the tomb, of MYRINE. By men Homer meant the vulgar people of Troy; by the Immortals he intended the polished Greeks. Here we see the partiality or rather the pride of the poet respecting his language and countrymen. The phrase is purely oriental. The elegant Sheokerit is flyed Daub Nagorie, writings of the Immortals. Conformably to the same lofty figure, Homer calls Greek, from its superior polish, the language of the immortal gods, while he characterizes the dialect of Troy, from its barbarity and rudeness, the language of men.

The explanation which the critics have given of ܒܠܝܫܢܐ is various, each rendering it more uncertain and improbable. Hevescius explains it to be ܫܒܐ Temen. Others derive it from the name Temen, or Temen. To go; and others again from ܒܒ換え, babei, because, as Heyne says, collis fentos effus potus. As the commentators did not know the origin or meaning of the word, it is not to be expected that they should understand the singular philology grounded upon the use of it. Euflathius's account of it is, to ܡܠܟܐ ܒܠܝܫܢܐ ܐܒܪܝܢܐ ܝܡܝܐ ܠܐ ܐܕܝܢ ܐܦܠܐ; the poet afribes the last name to the gods. The scholiast says, to ܡܠܟܐ ܒܠܝܫܢܐ ܐܒܪܝܢܐ ܝܡܝܐ ܠܐ ܐܕܝܢ ܐܦܠܐ; the poet refers the more ancient name to the gods; the more recent name to men; which cannot be true; nor ܒܠܝܫܢܐ is at least equally ancient with ܫܒܐ. Chorik comes nearer the truth, who supposes the language of the Immortals to mean the language of the learned; and this great critic would have seen that Homer intended to contrive not the language of the learned with the vulgar Greek, but the polished language of the Greeks with the barbarous dialect of the Trojans, if he had been aware that ܒܠܝܫܢܐ, in this dialect, meant a tomb, or the same thing with ܫܒܐ. We shall only observe that this word exists in Celtic, and bears the same signification—bedd, a grave.

The next passage in which the use of the Oriental tongues serves to illustrate obscurities in Greek authors, we shall select from the Agammemon of Aeschylus. On this paragraph much has been written, and written in vain by the critics. Clytemnestra, the lady Macheth of ancient days, burnt in it out of her fidelity, during the absence of her lord, and the joy with which she would receive him on his return.
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: "Pau
dly says, "aliquid subtil quod non intelligo." Mr.
Heath disapproves the allusion, though he thinks it a pro-
verbial expression, the grace of which is lost on our igno-
rance, and says, "quod nos non vidimus alius oblitus forfan
vedabit." —In the old Perian called the Pelcis, the first
principle of things was called ἔννοια; and though superseded
by fire to be fire by the disciples of Zoroaster, the term is a mo-
dification of ἔννοια ἐκ, water, which the Arabsians main-
tained 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 ἔννοια, to plunge,
(which Lempf. actually deduces from ἐννοια), hence too ἔννοια
immergent; and the phrase ἔννοια ἐκ is a metaphor for
a flood or current, it being produced by a weapon plunged
into the body as into water. The sentiment which the
words convey to the herald, whose Clytemnestra ad-
dressed, is to this effect, I know no pleasure with any man,
and feel no more the sting of columny, than the points of fleur. But
the language is fluently equivocal; and in this peculiarity
confined quite once to the wild 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 flood plunged
in him, (as we have mentioned) by another husband. This
artful equivocation arises from the manner in which the
clastic ἔννοια τῶν ἀνδρῶν is connected. If taken with τῶν,
the lines convey the first sense; but with ἔννοια ἐκ τῶν,
they convey the last.

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 signification as soon as the queen
withdrew from the stage.

Ἀπὸ μὲν ἦν τὴν πιστικὴν τὴν ῥήσιν τῆς. ὢντων
τῆς ἐννοιας ἐκ τῶν ἀνδρῶν τῶν.

Which may be thus rendered: This woman hath told the
learning (the who hath ye to learn, not what she it), a tale which
different interpreters perceive to be very becoming — well to
concern her character and virtues. Here ἐννοιας ἐκ τῶν.
depend on εὐπρκτες, and the Chorus intimate, that her words,
understood, as they seem to have been by the herald, were
false and unbecoming, but skilfully true and appropriate in
the sense in which they, who knew the woman better, had
reason to regard them. Taken in the first sense, the metaphor
χώρας ἐκ τῶν ἀνδρῶν is too violent for the simplicity of the
sentiment; and the falsehood, moreover, is so glaring as to clas
the queen with the basest of deceivers, without a trait of
that masculine intrepidity and elevated ardour with which she
preferred to the object of her design. In the latter it
exactly suits the dark ambiguity of prophetic 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 ἐννοιας as at once
expressive of her true feelings, her artifice, and her intre-

cility.

Lycophon, who flourished under Ptolemy Philadephos,
is known to have fluently affected the use of hard and ob-
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feare terms, which, from their antiquity, must demand the
attention of Latin scholars. In his Caffenda, the only
remains of his voluminous productions, occur these lines:

Τραγωδικῶν στροφῶν τῶν
κυκλωμάτων καὶ τῶν
ἀριθμῶν τῶν
Διδώσον μοι ἐκαλούμενον
πρὸς τοὺς τοὺς τροποὺς
τῶν
Ποιητικῆς εἶναι ἑκάτερον.

They contain a prophetic address to Peris, now com-
mensuring his expedition for the rape of Helen, and may thus
be literally rendered: — The ship and feet of Pherceus will bear
their to the two parts and coasts of Cythera, in these fixed
to the rocks the crooked teeth of the pine, Hecateros (i.e. fjaffarmis,
of the flood. Pherceus as an artill construclcd the ship,
and as a footlayer, conflated the gods, and endeavored
to conciliate them to the projected expedition. As such,
he was naturally led to give the vessel the name of τριγώνων,
which with the Greek termination is the Chaldean and Phere-
nician term for the tittery gods, τριγώνων, or τριγώνων.
The feholiast says, it is the name of a foreign flise, and in
this he is followed by Hefychius. It was certainly usual
to carve the images of the gods on the ship, which they
were supposcd to protect; and to them the sailors fled in
seas 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 Phenicians; and it was natural for them
to call their ship by the name of those gods which were sup-
posed to preserve them. The rudder, the oars, the fails,
by which the vessel was moved, are here affectcdly called the
fleet of Pherceus, he being the author of them. Of
the derivation of the term the feholiast and Hefychius ap-
pear equally ignorant, and the whole of this passage is a
shaking influence how incompetent the ancient commentators
were to explain in many places the terms of the Greek
tongue.

The ancients had statues of their gods erected before their
doors, and in the entrance of their harbours. These
received the salutations of strangers and passengers. Lucer-
clius mentions this custom in his first book. Hence the doors
and ports received the name of ἄνευκρισίως, as being places
where the gods were saluted, from the Arabic ἄνευκρισίως, saluta-
tion. The account which the feholiast gives of this term
is ridiculous: συλλογικῶς ἐν ὑπνωμένοις, τοῖς περὶ σαλ.
τιαμον. The explanation of Hefychius is more rational,
though not the true one: συλλογικῶς ἐν ὑπνωμένοις τοῖς περὶ
τα καλημενα. 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, ἄνευκρισία, the Hebrew ἄνευκρισία,
or ἄνευκρισία, (the vowels being arbitrary, and not exiting but
as included in the confinements of the original) signifies
to divide, and thence as a noun any thing divided, such as
portions of the land and sea. From the fum original is de-
formed τριγώνων, as serving to divide the earth into distinet
territories: hence too, the Latin plag, a clime or region.
Finally, the unfail term τριγώνων originated in the Perian
[inus], an extremity or limit which, as the limits of a river
came hence to signify its banks; as the limits of the sea its
shores, or the rocks lying them. The limits of a forest are
its pelds; and hence the Celtic word kyner, the door pelds;
and probably from the same source, on account of their
remotenes, has been derived the appellative signalized to the
Canary Islands.

The attempts of Paris, under the auspices of Pherceus,
to appease or conciliate the gods, are alluded to by Horace,
lib. 1. 15. who appears to have had the dialogue of Ly-
cophon in his view. Pherceus, the first adviser, perhaps,
of the expedition, is represented by Homer as properly punished for he received an ignominious death from the hand of Merion. The poet adds, II. v. 65, ἑαυτοῦ τε καὶ τοῦτο ἄκομη, since he did not at all know the decrees of the gods. To say that Phereclus did not profess 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 unfurnished? But when it is considered that Phereclus had pretended to be so knowing, and probably predicted ultimate 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 divine voice, or, by his imperturbable courage, 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 influences 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 classic 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 Eal. The derivation of the Greek from the oriental tongues, the frequent use of terms which Homer, Hecad, Lycephon, 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 undervailing of a place in a dictionary of science.

In the left 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 soften down, in the rapidity of utterance, into a mere aspirate, till it at length vanishes. Thus coranu has degenerated into born; ἑπί, into hémus, earth; and into hósm, a creature of earth, man. Thus also the Hebrew יבוק (y’hok), which signifies life, felt, self, appeared in Greek in the form of ἑπί. Moreover יבוק, labar, a liver, gave birth to ἐπικῶς. This word retains an unquestionable mark of its derivation, for it has the form יבוק, labar, ἑπικῶς, ἑπικός: and this variation has been transplanted into the Greek ἐπικῶς and ἑπικός. 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 diacritical.

The guttural, when softened into an aspirate, is apt to be diluted into a long vowel. Hence the reason why ἑπί, in the ancient Greek, seems to have been accompanied by an aspirate, as in ἑπίκου. On the same principle that a guttural softened into an aspirate, the aspirate often melts into a gentle breathing, or becomes in pronunciation quite quick, as the Latin honor and honest become in English honour and honest, the b being mute. On the same principle, though became silent in our tongue, as in taught, fought. So in the Greek ἱλάτ, ἱκαν, a king, has degenerated into ἱλαιτ, which Homer pronounced ἱλαιττ. This leads us to remark, that the aspirate, instead of vanishing, was changed into a labial letter a, o, b, f, or s. Thus laugh, cough, which are full strong guttural sounds among our northern neighbours, are found affirate, affrere, among us. Thus also in Greek, what was at first written ἱλαιττ, was pronounced ἱλαιττ; and the words ἱλαιτ, ἱκαν, were founded von, von, von, or von, fio, fe. But the digamma did not always originate in a guttural, but sometimes in consonants allied to our s or z. Thus from θυηθ, zico, is derived the Greek σιω, which in Homer is found σιω; hence the original is σιω, hence the Latin sedge. So again from ἶθ, still, is taken myθ, wim, founded σιώθε, hence σιώθε, and σιωθε.

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 farther seem to have used vowel: only in conjunction with consonants; and 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 o; but still avoided the diphthongs, and when any two vowels concurred, they converted the first of them into a labial consonant. Thus, πράξιτης, was founded not λαμπετωνί, but λαμπετωνί, or λαμπετωνί; and μουθων, pronounced μουθων, or μουθων; μουθων.

This letter is called digamma, because it has the form of two gammas, one upon another like our capital F, and also called ἐλλάτ, as supposed to belong exclusively to the ἐλλάτ dialect. But this account of it proves, that it did not belong, as Dr. Bentley and others have supposed, to the ἐλλάτ 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 cafe 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 r, r, r, b, or s. But the digamma, it will be said, 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 compounding and writing his poems, and the last in relating them to the people. The written form, we may suppose, 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 insensible in the conversion 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 influences of it prevail in all languages, both ancient and modern.

The preservation of the aspirate in the written language of Homer,
Greek Language.

Homer, while the digamma was used in reciting them, is a proof (if a proof be wanting) that Homer did actually use a written language, and that his works were preferred by a written language; otherwise the aspirate would have been lost, 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 insert the digamma, he would corrupt the original orthography of Homer, and sublimate in the room of the original characters the corruptions of pronunciation.

We shall now make some observations on the leading parts of speech, which may serve to unfold the peculiar nature and amazing extent of this language. As gender is the distinction of sex, there cannot in strictly be in any language more than two genders, masculine and feminine; nouns expressing inanimate objects, or things without life, being in a philosophical sense neuter or neither 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 soon regarded as an index of the gender, without any reference to the meaning. Thus nouns designating females ended in $s$ or $s$; 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 $s$ or $s$, though meaning things without life, are generally masculine, because there 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 signification and the termination: the former ascertaining the gender of living things, or things whole sex 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 some terminations common to males and females, and these afford such analogy an opportunity to operate. Thus $aov$, 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 $s$ $s$, earth, or from the passive nature of its signification, 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 Arilaphones $s$, 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 $s$, with the specific names of trees in $s$, are 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 the final is invariably appropriated to feminine nouns, $s$, the sex, is feminine; on the other hand, $s$, time, 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 use 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, though it may enable the Greek to express the number two or pairs with more emphasis and precision. It was, therefore, rejected by the Eolians and by the Latins, who derived their tongue from the Aegaeic dialect. The seventy translators, moreover, have rejected the use 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 $s$, in Greek expressive of cases, clearly shows that this is not the primary meaning of a case. For $s$ means a fall, and, from signifying a fall, it came to signify the place in which a noun falls in a sentence. The idea, 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, $s$, i.e. the direct or straightforward position; but if a noun expresses an object or quality indirectly, it is said to be in an oblique position, $s$; and this deviation from a direct to an indirect position, as the subject of discourse, is in the language of grammarians farther called $s$, declension. Farther, 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 cause, 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 cause, i.e. denoting the agent of an active or the subject of a neutral or connecting verb, is in the nominative; that of effect in the accusative; that of beginning in the genitive; that of medium or instrument in the ablative; and that of end in the dative. The nominative alone is called the right or direct case, the rest are all deemed 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 as our ideas of relation arise from the things related, and which succeeded them in their formation, prepositions should, and probably did, in the early use 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 it a diversity of terminations. Hence the origin of cases in the ene in which cases have hitherto been understood by modern grammarians. It is worthy of remark, before we quit this subject, that the nominative, as expressing $s$, 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 fast 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 sense of possession. On the other hand, the accusative is nearly allied in tense to the dative; but the former is not used in its strict and original signification, unless it denotes an effect, or the thing in which action terminates; while the latter, in strict propriety, marks the end to which motion points, and in which it terminates. The genitive flands 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 case therefore denotes one of the most important and distinct relations in language, and yet the Greek, with all its boxed copiousness and precision, 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 cause, distinct from
that which marks effect, that is, why the nominative and the 
accusative of Greek neuter nouns are always the same.

A multitude of nouns in all languages express the abstract 
ideas of action, and consequently are derived from verbs, as 
substitutes to verbs in their formation. Our ideas moreover 
of the persons, the characters, the offices of men, are de- 

erived from the same sources; and from verbs are derived 
the nouns which express those persons, characters, and of- 

ci ces.

The name of the actor is derived from the corresponding 
verb by adding τας, τας, και, ως, as μακας, to learn; μακας, 
the person that learns, a learner; κατας, to seek, κατας, 
μακας, to syncope, μακας, the person who seeks; κατας, to 
flow; κατας, a seeker.

Nouns expressing the action of the verb abstractedly 
considered, or the effect of that action, are derived from 
the corresponding verbs by adding τας in the room of the 
final ω; as εισοδης, to enter, εισοδης, εισερτος, the 
all of entering; εισοδης, to produce; εισοδης, the 
att of producing; εισοδης, to judge; εισοδης, judgment. Hence it is evident that verbs in ω or ως, βς, κς 
must have their corresponding nouns in τας: the form in ως, κς, 
and those in τας (for τας) in τας; and those in ως and κς (for κς, κς) in τας. The penultimate vowels τας and κας 
are changed into τας, and κας into τας; as μακας, to learn; μακας, influence; μακας, to 
reify; μακας, residuum.

Other verbs are changed into abstractive nouns by changing 
the last syllable into τας or τας, or simply into τας, the penul- 
imate: being changed into τας after the analogy of the perfect 
middle: as εισοδης, to enter; εισοδης, εισερτος, a fight; εισοδης, 
κατας, καπας, γνωςτος, a sound; εισοδης, εισοδης, to plunder; εισοδης, εισοδης, to 
define; εισοδης, definition; κατας, κατας, to corrupt; κατας, 
corruption; κατας, to flow; κατας, seed.

Adjectives are converted into abstractive nouns by changing 
the last syllable into τος, or τος, or into τος, or into τος: 
τος, quality, such; τος, quality; κας, κας, kase; κοιτος, 
κας, kase; κας, alone, or one; κας, the number one; κος; 
κος, the number two; αλος, true; αλος, truth; 
αλος, approved; αλος, approved.

Adjectives, being the names of qualities, are taken from 
the names of the objects to which those qualities in a prominent 
manner belong; as κας, an as; κας, an as; κας, an as; κας, wind; κας, windy; κας, windy, like the wind. But 
adjectives are derived from nouns by annexing to them the 
verbs expressive of summation, κος, like; κος, resemblance; 
κος, such, like; as κας, κος, a man; κας,的人, man-like, manly; 
κας, for κος, κος, man-like; also κας, κος, for κος, κος, 
having the form of a man, manly. This composition 
is the origin of that class of nouns called patr disaposes. 
Πλος, Πλος, one having the form of Poles; i.e. the son 
of Poles.

There are in Greek but two personal pronouns, that is, 
substitutes for nouns, or, as we have explained them in the 
article Grammar, numeral adjectives, affirming the charac- 
ter of nouns by association with the verb. These are τας, τος, τος, 
themselves, and they are evidently derived from the Hebrew 
and Arabic. In which in Greek is written in the various forms 
τας, τος, τος, τας, τος, or the Hebrew τας. Hence the 
ionian, τας, or the Hebrew τας. Hence the second per- 
son in every tense of the active voice terminates in τας, with τας or a short preceding. The subjunctive 
τας, τας, form no part of the original pronouns, but were in- 
ferted, as is often the case, to lengthen the preceding vowel. 
The third pronoun in Hebrew is נון, or, which is the 
parent of he in English, and in Greek of ἔ. This, with the 
subjunctive, forms the third person, τας. To the origi- 
nal τας the Ionians added τας. Thus in verbs in μ, μ, μ, 
τας.
The imperative mood, originally in the first person, retains the terminations of the imperfect tense; as ἂν, let me receive. Hence, dropping the final τό, it has, in the common tongue, the first person in ἂν έλθῃ. The pronoun το, which, in Persian, is to added in the form of τώ, constitutes the second or third person—τώς τά, κ.τ.λ. And τέω, contracted into τώς, forms the third plural—τώς τά, which, by dropping τέω, is again abridged into τώς, 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 παρελθόν, but in the future. It is impossible, therefore, is reason, that the imperative mood can have a middle tense. Thus, τέω is the present imperative, or that of the second future; and τάς τά the future future, not the first aorist. In some of the dialects, τάς τά is substitituted for the subjunctive vowel. On the other hand, the Ionians change ἂν, with or without its concomitant vowel, into τώ. Thus, in the imperfect, for ἂν, we understood 1 I was: for the pluperfect τώστιν or τέωστιν, which the Attics contracted into τκύστιν; and in the third person plural, of the passive form, for ττωστιν, they write ττοκτστιν, and for ττάκτστιν, ττάκτστιν. In the same manner τάκτστιν, which is said to be the first aorist, but which, in reality, is the first future, becomes, when τά is added, not τάκτστιν, but τάκτστιν. From the imperative thus principally ending in τά, we obtain the Attic third person plural in τάκτστιν ἂν τάκτστιν, which are contractions of τάκτστιν ἂν τάκτστιν, the first being ςτάκτστιν or τάκτστιν, and ἂν τάκτστιν for τάκτστιν. By the above Ionic analogy, we also obtain what is called the Ἱωδικé first aorist, τάκτστιν, which has the personal terminations of the first aorist indicative. It is thus changed from τάκτστιν or τάκτστιν, used for τάκτστιν, in the same manner as θέλεις is for θέλω.

The infinitive is formed by appending τά, or, as it is in Hebrew, with the subjunctive, or by suffixing τά, in Hebrew. In the perfect it has τάκτστιν, and in the imperfect, τάκτστιν. In the perfect it has τάκτστιν, and in the imperfect aorist is dropped—τάκτστιν, probably for τάκτστιν, which, after the analogy of the perfect, would be τάκτστιν. In the Ionic and Attic dialects, the infinitive, however, is formed from verbs in μί, though obsoletely, τώτστιν, τώτστιν; μύτις, τώτστιν, or μύτις, τώτστιν, or μύτις, τώτστιν, μύτις. To these, after the analogy of the perfect, is added τάκτστιν, τάκτστιν, τάκτστιν, τά κτστιν.

The passive voice is formed by combining the subject of discourse with the personal pronoun in the dative case—μί, μί, τάκτστιν. Thus ἐκαστός, hasfe for me; ἐκαστός, hasfe for thee; ἐκαστός, hasfe for him. These combinations, which by a flight change become ἐκαστός, ἐκαστός, ἐκαστός, came to convey the idea, I have a house; thus ἔχω a house, or I have a house; and art house. 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 sense of the verb. The dual τά is made passive by changing τά into τάκτστιν, τάκτστιν, and not τάκτστιν; and it is worthy of remark, that in the first person plural it takes τά before it very frequently, as τάκτστιν for τάκτστιν, and in the imperative τά for τάκτστιν.

As the personal pronoun, combined with the radical word
word to form the passive voice, was εκβαίνω, the primary form
of the verb must have been εκβλέπων, and not εκβλέπων; and
in the imperfect εκβλέπων, and not εκβλέπων: but afterwards
was changed into ο, in other numerous inflections. Hence
the passive form of verbs in ο was originally the same with
that of verbs in μ: and this form had only two Futures, μοι,
for the present, and μοι for the past. The second perfect
singular is formed in the common tongue by dropping ε, and
contracting the two succeeding vowels in every mood and tense.
Thus εκβλέπων, εκβλέπων, εκβλέπων; imperfect εκβλέπων, εκβλέπων;
first aorist middle εκβλέπω, εκβλέπω, εκβλέπω; optative
εκβλέπων, εκβλέπων; εκβλέπω: The first future middle is
derived from the first future active, by changing ε to εκβλέπω
εκβλέπω, εκβλέπω, εκβλέπω. The second future middle is derived from εκβλέπω,
(which is from the obolote εκβλέπω, εκβλέπω, εκβλέπω): This drop
ε, and is contracted—εκβλέπων, εκβλέπων. Hence what is
called the second future is no other than the first future.
The same obolote radical has given rise to the second future
passive, which is no other than the first future—εκβλέπων, εκβλέπων,
eκβλέπων; while the first future is from the obolote in
εκβλέπω, εκβλέπω, εκβλέπω: εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω,
εκβλέπω, εκβλέπω, εκβλέπω. Hence what is
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The same obolote radical has given rise to the second future
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eκβλέπων; while the first future is from the obolote in
εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω.
In the third plural ε is
dropped—εκβλέπων, εκβλέπων, εκβλέπων. So in the active voice,
εκβλέπων for εκβλέπων; εκβλέπων for εκβλέπων; εκβλέπω for εκβλέπω
and εκβλέπω for εκβλέπω. In the infancy of language, while
words were yet scanty, the most natural way 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, μοι, με, I differ, differ, blended into one
word, become μοι, and means I greatly differ: εκβλέπω,
εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω. In the third
plural ε is
found in εκβλέπων, εκβλέπων, εκβλέπων. Hence what is
called the second future is no other than the first future.
The same obolote radical has given rise to the second future
passive, which is no other than the first future—εκβλέπων, εκβλέπων,
eκβλέπων; while the first future is from the obolote in
εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω.
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found in εκβλέπων, εκβλέπων, εκβλέπων. Hence what is
called the second future is no other than the first future.
The same obolote radical has given rise to the second future
passive, which is no other than the first future—εκβλέπων, εκβλέπων,
eκβλέπων; while the first future is from the obolote in
εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω, εκβλέπω.
it flows from its source, or as a tree becomes greater with
its gradual expansion from the root. For this reason to
abbreviated, sometimes increases the figurification of its com-

The Greek surpasses almost all other languages in the
number and variety of its terms; and the causes of its
superior copiousness are, firstly, the many dialects which it
comprehends, and which served to divide by accidental
corruption the same primitive into many words; secondly,
the facility with which nouns combined with the personal
pronouns in the formation of verbs, and the great variety
of ways the same noun may be converted into verbs, so as
to form distinct verbs, yet allied in sense and found to each
other; thirdly, the various ways in which verbs, adjectives,
and participles have been changed into abstract nouns; and
fourthly, the great multitude of compound terms, formed by
the union of verbs or adjectives with nouns, and of prepo-
sitions with verbs. The combination indeed of prepositions
with simple verbs is the most fertile cause of the extent
and comprehensiveness of the language. The simple verb ἔρχο
thus combined, has given birth to no less than fifty-two
compound verbs. This single instance sufficiently shews
the genius of the language, and proves that, however few its
simple primitive words may have been, its derived and com-

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 language, as well as of
music, depends on the melody of its sounds; their measure
rhythm, their variety, and their perfections to the sub-
ject, which they are meant to describe or express. The
circumstances of the Greeks in the earlier 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
inclined to the persuasive accents of his tongue. The
perpetual necessity of employing the power of eloquence,
within the limits of their political state, had taught the
original tones and cadences, by which men, as yet un-
practiced in the use of arbitrary signs, had made known their
affections and their wants. These tones and cadences, in-

The native Greeks are contented to speak the language
without cultivating it; the Turkish polities not allowing
any of the subjects of their empires to apply themselves to
the arts and sciences.

GREEK

It is not easy to assign the precise difference between the
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 and Spanish; we insinuate in those 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 enclitic particles to the end of them; it confounds
the vowels a, e, I, and the diphthongs a, e, which they
pronounce and often write only in. They likewise often
confound cases, moods, tenses, and particles. See Brewe-
wood'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
prevailed with them; divers names of dignities and offices
unknown to the ancient Greeks; and abundance of words
borrowed from the vulgar tongues of the neighboring
nations.

Accordingly one may distinguish three ages of the Greek
tongue: the first ended at the time when Constantinople
became the capital of the Roman empire; but 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 intro-
duce new words into the language, it seems necessary to
begin the second age of the Greek tongue from that epocha,
which hailed to the taking of Constantinople by the Turks,
where the last age commences.

GREEK Lexicon. See Lexicon.
GREEK Midstony. See Masonry.
GREEK Maj. See Mass.
GREEK Minks. See Anchoret.
GREEK Orders, in Architecture, are the Doric, Ionic, and
Corinthian; in contradistinction to the two Latin orders,
the Tuscan and Composite. See Order.
GREEK Pitch. See Pitch.
GREEK Rite, or ritual; is distinguished from the Latin.
See Rite.

GREEK Status. See Statue.
GREEK Valerian. See Valerian.
GREEK Wine. See Wine.
GREEK Year. See Year.
GREEN, in Biography, an organ-builder, on the model of
Smetzer, whom he succeeded, and has left behind him
monuments of his skill and ingenuity in many of our churches
and mansions of the nobility and gentry.

To this model 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 called the
touch, voiced the pipes, and contrived a swell of the whole
instrument, in a manner superior to any of his predecessors.
He died when securely arrived at the midway of the period
of mortal life.

GREEN, Matthew, was born, probably in London, about
the year 1635. He was educated among the dissenters, and
his learning extended to the knowledge of a little Latin.
At this period, those who differed from the established
churches were rigid in their principles and gloomy in their
manners. He appears to have been, on this account, dis-
guised.
gufted with those who were the associates of his youth, and to have completely abandoned the party. He speculated freely on religious subjects, and at 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 trust 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 Splen." This poem presents a picture of his mind and manners, which implies a practical philosophy of the sober and rational Epicurean cast. The other works of Mr. Green consist of "The Grotto;" "Verles on Barclay'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 similitude, in which wit principally consists. Few poems will bear more repeated perusals; and those who can fully enter into them, they do not fail to become favourites."—Gen. Biol.

Green, one of the original colours of the rays of light. Grains 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 deliquium, or with spirit of ful ammoniac, 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 cresses, or the blue tincture of cyanus, and the white spirit of ful ammoniac, produce green. The solution of verdigris becomes colourless by the affection of the spirit of nitre, and by the affection 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 stame 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 sulphate of iron. As for silks, they are first strongly alummed, then dyed yellow with weld, and afterwards finished 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 refills the action of light and air, is given by the combination of Prussian blue and yellow, but this colour is destroyed by soap and alkalies. To cotton this colour is given, by first dyeing it olive with weld, or any other yellow dye, and a compound mordant of alum and iron, and then staining the green by prussian of potash. (See Prussian blue.)

Berthollet observes, that in the proofs 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 full yellow, and unite with the blue into a fine green. The only simple green in common use is that of the carbonated 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 perulac as verdigris is added to it, the mixture is heated, and the cotton, previously Alummed, is passed through this bath. The colour then given is a soft apple-green. Akinin's Dict.

The dyers make divers tints, or calls of green, as light green, yellow green, green, green, lawn green, sea green, dark green, parrot green, and sodden green.

Green, brunswick, is a pigment used by some of the German artists, which they prepare by adding to the saturated solution of one part of nitrated ammonium in cold water, three parts of copper clippings; and by covering the glass vessel that contains it with a snuff box so as to keep out the dust, and placing it in a warm situation, so that the mixture may evaporate, which purpoue will be effected in a few days. The nitrated ammonium form begins to be decomposed by the copper, which is corroded and converted into a green oxyd. When the whole is evaporated to dryness, let it be digested for two or three successive portions of spirit of wine, as long as any green oxyd is taken up; then add the solutions together and expel the liquid by a gentle heat, the residue is a pure dark green sub-urate of copper, known in the shops by the name of refined Brunswick green.

Green, Mountain, or Hungary green, is a sort of greenish powder found in little grains, like sand, among the mountains of Kamnanof in Hungary, and those of Moldavia. Though many hold, that this mountain green is fictitious, and the same with that of the ancients called flav aera, prepared by adding water, or rather wine, on copper red-blot from the furnace, and catching the fumes thereof on copper plates laid over for that purpose; or by dissolving copper-plates in wine, much as in making verdigris. The painter makes use of this colour for green. It is sometimes counterfeited by grinding verdigris with corfu.

Green, Calamine, and diffusil green. See Verdigris.

Green, Prussian. See the process for making Prussian blue.

Green, Sap. See colours from Fruits, Buckthorn, and Saffron.

Green, Saxen, an extremely beautiful green colour, so called because the blue part is given by the Saxen blue or sulphate of indigo; the process of dyeing which is this; the cloth or silk is first to be dyed a Saxen blue in the following manner. Having ground nine parts of indigo with twenty of red arsenic into a fine powder, add forty-eight parts of strong spirit of wine, which mixture works, grows hot, and emits a sulphurous fume. After boiling 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, dropped into hot water, immediately spreads, tinges it of a fine light blue, and fits it for dyeing...
the prepared wool, cloth, or silk; and by increasing or diminishing the proportion of the blue composition, the colour may be rendered deeper or lighter. Thus, Dr. Lewis says, "the method used for preparing the blue composition by the dyers of Norwich, who purchased this secret from Saxony.

Three baths or soaks, thus dyed blue, is next examined, and then dipped in the yellow decocation of weld or fustie, and the defined colour will be obtained.

Fustie is commonly preferred as the yellow material, because it is less liable to be altered by the adhering acid of the muriatic indigo than weld or other yellows. To correct this effect of the acid, and enable quercitron to equal the fustic in this respect, (whilst its natural colour much exceeds it,) Dr. Bancroft advises, after the cloth has received the blue, to mix chalk with the alum mordant, in order to neutralize the adhering acid, before the yellow is given.

Or the subject 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 examined and well stiffed; and the cloth is then dyed in a strong decocation of fustic, to which, when cooled to a blood heat, is added muriatic indigo. Dr. Bancroft recommends for dyeing a beautiful Saxon green, the following expediency prepared by using the compound alum and tin mordant; put into the boiler six or eight pounds of quercitron bark to every hundred pounds of cloth; boil with a sufficient quantity of water; then add six pounds of the muriatic-fustic of tin, (in preference to the nitro-muriatic,) 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 indigo as may be thought necessary for the intended depth of colour, and then dyé the cloth in this bath with proper care. Aitken's Dye.

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 olive.

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 15,870, and its chief town is Kaatskill. — 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 8625. — Allo, a county of Kentucky, extending from Ohio river on the N., to ten mile state on the S., and bordering W. on the Mississippi river, and E. upon Hardin and Jefferson counties. The number of its inhabitants is 6025, of whom 816 are slaves. — Allo, county of N. Carolina, in the district of Newbern, containing 4218 inhabitants, of whom 1966 are slaves. — Allo, a post-town in Kumpock 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 Conestogacreek; 156 miles W. by S. from Philadelphia; containing about 80 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 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° 58'. — Allo, a river of Canada, which runs into the river St. Lawrence, 160 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 90 miles long, and 15, 20, or 30 broad in different parts, lying nearly from N.E. to S.W. 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 sluggish 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 Menomie 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, Kanawha, Botetourt, and Montgomery counties; about one hundred miles long and 45 broad; containing 3894 free inhabitants, and 277 slaves. The chief town is Lewistown; 103 miles W. of Staunton. — Allo, a river of Virginia, which pursues a S.W. course, runs into the eastern side of the great Kanawha. N. lat. 37° 57'. W. long. 80° 58'.

Green Bay, 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 cases.

Green Chees, in Rural Economy, the name of that fort of cheese which is prepared with some kind of green vegetable juice, as that of sage 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° 50'.

Green Crop, in Agriculture, that fruit which is formed of some kind of green vegetable; such as that of some sort of artificial grass, th turnip, cabbage, 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 constituted one of the most important improvements in modern agriculture. By this means, land has not been prevented from being exhausted and worn out, but brought into the most profitable cultivation for the growth of grain, without undergoing the injurious effects of naked or sward following. It has likewise had the effect of greatly increasing the number, and improving the quality of all sorts of live stock, in consequence of their having more abundant supplies of food, and those 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 flocks 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 this, great advantage might, in different climates of cultivation, find be-
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 feeding of milch-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 fort of application, on the supposition of their being fold to the cow-keeper, and the expenses of their cultivation, are stated in the following manner.

Green Crops.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s.</th>
<th>d.</th>
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</thead>
<tbody>
<tr>
<td>Twenty-two acres of green crop, at 10s. per acre</td>
<td>220</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Expenses of raising and cleaning.

<table>
<thead>
<tr>
<th>Description</th>
<th>£</th>
<th>s.</th>
<th>d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four acres of cabbages, at 12d. per acre</td>
<td>48</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Two acres of Swedish turnips, at 7d. per acre</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Six acres of common red turnips, at 4d. per acre</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>One acre of Kahlkabi</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nine acres of rape or cole, at 3s. 10d. per acre</td>
<td>31</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

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 fort 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 situations, 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-colter 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 fowing the land with broad cast turnips, the work should be performed at least three weeks before the feed is put into the field, and that it should be afterwards only very slightly harrowed in. See Turning in Green Crops.

Green Earth, in Mineralogy, Baldeago, Saint; Chlorite baldeago, Brong.; Argilla veronese, Wern.; Gerinade, Wern.; Tale chloritosegregigraphi, Halis; Verde di Verone, Verde di Trentino, Ital.; Veronese 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 celandine green, passing sometimes into deep and mountain green, frequently with an admixture of grey; it has also been observed of a more or less pure olive green.

Green Earth occurs massive and disseminated, in rounded and angular fragments, and in globular concretions; likewise in grains mixed with sand, and as coating on agate balls, in the hollows of amygdaloid, (toad-stone,) &c. Internally it is dull, but on the ribs a fat-like lustre is sometimes observable.

Fracture incrustaceous, or more or less flat conchoidal, approaching to fibrous. Divisible into indeterminately angular, blunt-edged, opaque fragments.

It feels rather greasy, is always more or less soft, mild, and easily frangible; breaks rather shining; adhesion to the tongue inconceivable. Specific gravity about 2.4.

The chemical characters of green-earth, derived from Klaproth's analysis of three varieties, 5/6. 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, looses fix 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 glistering. That of Cyprus, after ignition, looses 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 glass, externally of a dirty-green colour, internally of that of emerald; in the clay crucible it is converted into a greenish-grey frit. The green-earth of New East Prussia, when freed from the admixed sand by elution, and ignited, changes its green colour into light leathers-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:

Green-earth of Monte Baldo,

<table>
<thead>
<tr>
<th>Description</th>
<th>Vol.</th>
<th>£.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>53</td>
<td>1.50</td>
</tr>
<tr>
<td>Oxid of iron</td>
<td>28</td>
<td>2.50</td>
</tr>
<tr>
<td>Magnesia</td>
<td>2</td>
<td>1.50</td>
</tr>
<tr>
<td>Kali</td>
<td>10</td>
<td>1.50</td>
</tr>
<tr>
<td>Water</td>
<td>6</td>
<td>0.50</td>
</tr>
<tr>
<td>Lofs</td>
<td>1</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Klapr. Beitr. vol. 4. 100

Green-earth of New East Prussia:

<table>
<thead>
<tr>
<th>Description</th>
<th>Vol.</th>
<th>£.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td></td>
<td>51</td>
</tr>
<tr>
<td>Alumina</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Magnesia</td>
<td></td>
<td>3.50</td>
</tr>
<tr>
<td>Lime</td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td>Oxid of iron</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Natron, with a trace of kali</td>
<td></td>
<td>4.50</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Lofs</td>
<td></td>
<td>0.50</td>
</tr>
</tbody>
</table>

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 amygdaloids, also in incrustation on the nodules of zeolite, &c. contained in the vacuities; sometimes as coating the sides of these vacuities, which are often partly filled with the earth. It is also, though less frequently, found in porphyry and basalt, as nodules in the heavier sandstone, and even in the rocks belonging to the new flint-formation, such as at Aischau in
in Bohemia, where calcareous tuft is seen alternating with narrow layers of a conglomeration, made up of grains of cal-
caeous spar, and blunted-edged fragments of the tuft to which
the green earth serves as the cementing substance. But
in the same place green-earth forms a flint-layer of about a
foot in thickness, whose base consists of waacke-like clay and
calcareous tuft; the roof of indurated marl. The green-
earth of New East Prussia, consisting of earthy particles
mixed with a coarse sand, forms a confusible bed in the
neighbourhood of the river Memel, between Lofoinia and
Sallowye.

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
Plaenitz, in Saxony; Oberstein, in the Palatinate; Kovac,
Kvania, in Hungary; Pontadaurer, in Normandy; Scotland,
Iceland, the Perroco-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 ex-
ensive, as for house-paint and &c.

The green-earth of Cyprus, according to Marti, is fold
at 4 plitters 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 ballad.

That of Bohemia, above mentioned, is fold, according as
its colour is deeper and its grain finer, from two to four
flowers the cwt. Part of it is also burnt there in small
kilns, and fold as a red pigment.

By the Italians green earth is called Verde di Brentani,
from the vicinity of Monte Bolca to a place of that name.

Green Fallow, 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
proceeds of naked or summer fallowing. This constitutes one
of the numerous improvements in modern husbandry. See
FALLOWING OF LAND.

Green Finch, in Ornithology. See Loxia Chloris. See
also Tanaagra Gyrola, and Fringilla bustrava.

Green Fitch. See Cad-Pinnard.

Green Food, in Agriculture, that sort of food which is
employed in its green or succulent condition, in the feeding,
foltering, and furthering of various kinds of live stock.
This is a sort 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 ex-
eriments in a proper manner.

Green Glaze. See Glass.

Green Head, or green-bay, in our Old Writers, the fame
with vert in forests, &c.

Green Hide, are thole not yet tanned, or dried, but
such as are taken off from the carcasses. See Hide and
CURRYING.


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. 75'.—Alfo, one of the lesser 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 Grafton.
S. lat. 14° 43'. W. long. 214° 5'.—Alfo, an island in Hud-
son's bay. N. lat. 61° 2'. W. long. 72° 40'.—Alfo, an
island in the Atlantic, near the coast of Main. N. lat. 44° 41'.
W. long. 67° 23'.—Alfo, a small island near the E. coast of
Antiqua. N. lat. 17° 13'. W. long. 61° 21'.—Alfo, a
small island in the West Indies, about a mile N. E. from the
island of St. Thomas.

Green Islands, a cluster of small islands in the Pacific
ocean, discovered by Schouten and Lee Maire, N. lat. 4°
53'. E. long. 154° 59'.—Alfo, a range of small islands
in that part of the East Indian sea, called the "sea of
Mincero," near the E. coast of Palawan. N. lat. 9° 33'.
E. long. 119° 6'.—Alfo, a group of low islands in Prince
William's Sound, situated within the S. W. channel, between
Montague's island and Knight's island. Capt. Cook, in his
third voyage, 1778, observed that they were entirely free
from shores, and covered with wood and verdure, and there-
fore called them by this name. The channel between
Montague island and the Green islands is between two and
three leagues broad, and from 54 to 17 fathoms deep.

Green Island Harbour, a bay on the W. coast of the
island of Jamaica. N. lat. 18° 24'. W. long. 78° 17'.

Green Key, or Pico, a small island among the Ba-
hamas. N. lat. 23° 59'. W. long. 77° 50'.

Green Lead Ore. See Lead.

Green Mountains, in Geography, a range of mountains
in America, extending N. N. E. to S. S. W. and dividing
the waters which run easterly into Connecticut river from
those which roll westerly into lake Champlain, lake George,
and Hudson's river. The ascent from the east to the top of
the Green mountain in Vermont is much more easy than that
from the west, till you get to Onion river, where the
mountain terminates. The vegetables that naturally grow
on this mountain are hemlock, pine, spruce, and other
evergreens, which always exhibit a green appearance; and
hence its name. The chain of mountains extends through
Massachusetts and Connecticut, and terminates in New
Haven. Kellington peak, the highest of these mountains,
is about 3454 feet above the level of the ocean. Morlo.

Green Point, a cape on the W. coast of Africa. S. lat.
11° 53'.—Alfo, a cape on the coast of West Florida, in
Penaculay bay. N. lat. 30° 31'. W. long. 87° 4'.

Green Suse, in Agriculture, a term sometimes provin-
cially applied to the common forrel.

Green Souring, a delicate to which sheep, calves, and
cattle are frequently exposed, and which is with difficulty
removed. See SCOUR.

Green-Shank, in Ornithology, the Scoplopa glutis
of Linnaeus; which fce.

Green Silex. See Chloraena.

Green Side, in Agriculture, a term often provincially
applied to grafsland, turf, or fward.

Green Silver, the name of an ancient custom within the
manor of Writtle, in the county of Essex; which is, that
every tenant, whose fore-door opens to Greenbury, shall
pay a half-penny yearly to the lord, by the name of green
silver. Blount.

Green Sed, in Agriculture, a term provincially applied
to grafs-ground, turf, or fward.

Green-Stone, in Mineralogy, according to the more ge-
neral acceptation of the word, is a rock composed of horn-
blende and feldspar, and belonging to what is termed by Wer-
nan the trap formation. (See TRAP.) Mica and quartz
are likewise seen to constitute ingredients of this rock,
but they are not considered as essentially belonging to it.

The Grovehill of Cronfield is, upon the whole, the fame
as our green-stone; but in some cafes too great latitude has
been given to that name.

This
This rock, with a view to the periods of its formation, is divided into primitive, transitional, and felsite greenstone.

The primitive greenstone 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 stained by it in such a manner, that it bears the greatest resemblance to small laminae of hornblende. In this case the blow-pipe, however, is the illusion by melting the hornblende; when the feldspar recovers its usual whitish color, and is converted into a white glass.

Werner subdivides primitive greenstone into four varieties: 1. Common greenstone, in which the two ingredients, mixed in different proportions, form a granular mass. 2. Parphyritic greenstone, being the common variety, including large crystals of feldspar. 3. Greenstone porphyry, in which "the granular basis, which is with difficulty distinguishable, includes crystals of feldspar." and 4. Green porphyry, in which "the granular nature of the basis is no longer visible to the naked eye; it appears uniform and simple; has a blackish green or pitchaceous green color, and includes crystals of compact feldspar." (Jameston.) To these are to be referred the porido nero, and porido 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 greenstone appears sometimes stratified. Gneiss is the rock in which the different varieties first appear; the next rock in which they occur is mica-flate, but the beds of greenstone 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. Jameston, 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 greenstone; and there, we are informed by this geologist, 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 greenstone in Bohemia; thus it is found in the Saatz district of that country, where it rears chiefly on gneiss. It occurs there also with quartz as a constituent part. The varieties mentioned by Reifs, as being found there within a narrow compass, are: 1. A small grained mixture of white black hornblende, which exhibits a tendency to a prismatic crystalline form, with yellowish white feldspar, and grey-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 assemblage 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 magnifying glasses, which discloses these ingredients collected into small spots and strips; it contains also here and there some scales of mica. 4. Var. in which the hornblende is seen partly mottle, in spots, strips uniformly blended with the feldspar and quartz; partly in small circular crystals that are divergingly aggregated, or cords each other in all directions; feldspar ticle and brownish-red; 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 feme 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 scales of silvery and yellowish-white micas. 6. Var. in which the texture becomes more thick-flaky; the yellow-grey quartz becomes predominant, the yellowish-white feldspar disappears almost entirely, and the hornblende is only thinly differentiated. 7. Var. in which the yellowish-white and reddish-grey feldspar predominates over the hornblende; which is seen partly mottle and in fine granular concretions, partly in inflated and disfigured minute ferruginous prisms, included in the feldspar; while the quartz is entirely wanting. It is remarkable that in this district the primitive greenstone is seen, by slow gradation, to pass over into perfect gneiss. 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 diminish, while the mica increases both in quantity and size, until perfect gneiss flanks confounded as the constituent rock.

This rock is common also in many other parts of Europe; but the accounts we possess of the greenstone of several countries is too imperfect to enable us to determine how much, if any, it may be considered as primitive.

The transition greenstone is not easily distinguished in hand-samples. It is characterized by Mr. Jameston 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 felsite greenstone, 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 oxys of iron, which, combined with the dark-brown hornblende, gives the rock a brown-red colour; hence it is denominated in Voigland, where it occurs, leber-fels, or liver rock. Beds of it occur in the upper part of Dumfrieshire, in the Hartz, Bohemia, &c."

Felsite greenstone. Prof. Jameston, in his "Mineralogical Description of Dumfrieshire," has given a short account of the occurrence of greenstone, both the independent coal-formation; and Mr. Fliri has discovered beds of amygdaloid in the first or oldest felsite-line-stone; where he has considered the author himself entitled to introduce what he terms the flip-trap, which is distinct from the still newer formation called the new felsite-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-spar; it often also contains deep cavities, which are lined with calc-spar, quartz, barytes, cubicite and prismatic; and the cavities are sometimes filled with water.

The greenstone of Werner's new felsite-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 liticite greenstone. 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 mottled, and these are usually whimber, and form a kind of amygdaloid. It is sometimes very distinctly stratified, and frequently occurs in veins." (Jameston.)

The afs to which the common greenstone is applied are

not
not unifonn. As it frequently contains a considerable portion of iron, and is sufficiently fusible, it serves for a flux in the iron work in Smoland. Of the porphyritic varieties of the primitive greenstone 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 velvet-black; and likewise with regard to the size of the whitish feldspar-crysdals: in one of them the crystals are very small, and this is more frequently seen among the remains of antiquity than the other.

Mr. Graffenauer, in his mineralogy of Alfac, mentions a black porphyry as occurring at Planant; and also as rounded blocks in the river Ill.

In the black Carcan porphyry, the feldspar-crydsals have a slight tint of green, like those of the antique green porphyry. Verber makes mention of a Sardiniun black porphyry, and Sauflaire of one found in the neighbourhood of Genevo, which, besides small prismatic crystals of feldspar, includes rounded grains of transparent colourless quartz. The latter addition is likewise observed in a variety of a blackish Siberian porphyry, which is sometimes wrought for ornamental purposes.

Antique green porphyry (porfido verde antico). This is the opidency 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 magarian stone called serpentine, a mixture of which, with primitive lime-stone, 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 but 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 Vico, in Piedmont; which, besides the feldspar, contains reddish grains, supposed to be garnets.

The green Carcan porphyry, found in the district of Nioteo, in Comice, has a deep brown green face, and fine white feldspar crystals: another, which contains some dark red garnets, occurs in the district of Gelo in the same island.

Sauflaire describes the green porphyry of Geneva, reminding the black porphyry above-mentioned, in the figure and colour of the feldspar and quartz, but differing in its bafe, which is light green and, in fragments, translucent at the edges. Both this and the black take an excellent polish.

The green porphyry of the Vojges has a dark green bafe, and contains numerous middle-sized feldspar-crysdals of a pale green colour. It is found at La Chevretcy, on the heights of Fred le Comte, and made use of for ornamental purposes. In another variety, found not far from this quarry, the feldspar-crysdals are so prevalent 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 paved by the improper name of green granite.

There is abundance of the green porphyry in the Pyrenes, where it is known by the old appellation of sphilit.

Greenslone slates, 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-flats, is considered as the newell of the 4th class 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 Geruford, in Saxony, of Adelors, in Sweden.

Green Swords, in Agriculture, a name applied to the grass, 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 mostly covered with a close compact sward; while in the contrary case, it is mostly light, open, and thin. See Sward.

Green Turtles, in Geography, a small island among the Bahamas. N. lat. 26° 40'. W. long. 77° 37'.

Green Wax is used where effluents are delivered to the rills of the stream; under the seal of that court, made in green wax, to be levied 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 Westchester, in the state of New York, containing 1581 inhabitants.

GREENBUSH, a township of Rensfielev 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 in 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 king’s steward, assisted by the treasurer, comptroller, clerks, and officers of the greencloth, &c. It took its name, greenclathly, 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 butts and bales assigned them by the board. All bills of comptrolments, relating to the office, were summoned up, and allowed by the clerks comptrollers, and audited by the clerks of the greencloth. They also appointed the king’s, queen’s, and household’s diet, and kept all records, ledgers, and papers, relating thereto; made up bills, parcels, and debentures for fabrics, &c. and provisions and necessaries for the officers of the pantry, battery, castle, &c. They also waited upon foreign princes, when entertained by his majesty. This court has been abolished.

GREENE, MATTHEW, Dr., in Biography, was the son of the Rev. Thomas Greene, vicar of St. Olave Jewry, 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 composer for the church, and obtained the place of organist of St. Dunstan in the West, before he was twenty years of age. In 1717, on the death of Daniel Purcell, 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 compositor to the Chapel Royal; and on the death of Eccles, 1735, master of his majesty’s band. In 1738, he obtained the
Greene had 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 Italianingers 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 provocatio he had received from Greene, after their first acquaintance, when we 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 enticethem, praise, and the love of fame, more frequently augments than diminish.

Greene had the honour, early in life, to teach the duchesses of Newcastle, which, joined to his professional merit, and the popularity of his conduct, was the foundation of his favour with the prime minister, and the notice of the fift people about the court. In 1730, when the duke of Newcastle was installed chancellor of the university of Cambridge, he was appointed to sit 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 stanza, 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 admire and respect the abilities of the two great musical champions, Handel and Bononcini, whose disputed talents occasioned as much discord 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 genius for composition, he could not help listening with pleasure to Bononcini’s performance on the violoncello, and to the grace and good taste of some 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 of the Chapel Royal; and in 1735 he succeeded Eccles Vol. XVI.

as composer to his majesty, and master of his band, in which station he set all the odes of the laurate, 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 volumes; and of these the merit is so various as to leave them open to much differentiation 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 raffa, which are always dull, tiresome, and indications of a facile fancy. The opening of his second solo anthem, vol. i, p. 25, is very solemn and pathetic, and the organ-part judicious and pleasing; but, page 45, Santa Rufalba tells her beads six times, while one very short passage is singing, “Lord how long wilt thou be angry,” alla Palafrinato, 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 favelished, improperly, is pert and unmeaning; nor is it ever more so than upon the first note of a movement. There are no fewer than seventeen or eighteen shakes distributed among the performers in the course of one page, which are more than a modern opera finger of judgment, taste, and expression, would use in a month, were his shake ever so 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 vow 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 common-place. Perhaps that is hardly enough to say of the second movement: “O Lord grant me a long life.”

“Let my complaint,” a full anthem, a 5, 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 peculiar 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 belc antorario songs. The same may be said of the next, for two voices: "I will seek unto God." "O God of my righteousness," is superior in the duet movement, solo voice, and chorus, to any thing in the preceding part of this volume; this anthem rises somewhat above mediocrity. "O give thanks," is wholly built with Corelli's and Handel's materials, though somewhat differently disposed; particularly page 86, where the whole harmony moves together, one note lower, three times, after a crotchet rest, to this base: E, B♭, G, E♭, D, A, G, D♭, C, C. "The Lord is my shepherd," has too many light songs-passages in it, notwithstanding the white and square 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 parts, however, in the chorus, are very common. The anthem in eight parts, a due corde, "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 places, 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-house-passages; the first movement is heavy and monotonous; the antidual time, by the repetitions of an old harpsichord-lefso passaige in the base; the chorus justifies Mr. Mason's cenure of the author, (collect. of the words of anthems) for his too long and frequent divisions; there are too vulgar and riotous for the church, and, indeed, would have no merit of novelty any where. The mover, page 151, upon which the last chorus is built, has more of the dancing minuet, or Vaux- hall song, in it, than belong to that species of gravity and dignity which befits devotion. We think we could neither pray 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 mastered; the melodies, for the times when they were produced, are elegant, and display intelligence and invention. It was facetiously said, during the life of this composer, that his musical music left the church, and his anthems of the theatre. The truth is, he produced but little fecular music. His song of "Go rife," was long in general favour, and force of his early ballads, as "Busby, curious, thirly fly;" "Dear Chloe" while thus beyond measure, &c., were the delight of ballad-smongers fifty years ago. The collection of harpsichord lessons, 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 so elaborate as those of Handel, nor so difficult as the lessons of Scarlatti, or the sonatas of Alberti, 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 scores; a plan which he did not live to accomplish; but bequeathing his papers to Dr. Boyce, 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. Boyce.

GREENE, in Geography, a county of Washington district, in Tennessee, containing 7610 inhabitants, of whom 471 are slaves. Greenville college has been established by law in this county. (See GREENEVILLE.)—Allo, a county in the upper district of Georgia, bounded W. by the upper part of Ocone river, E. by Wilkes county, and S. by that of Washington, containing 10761 inhabitants, including 3657 slaves. The chief town is Greenborough.—Allo, a county in the state of Ohio, bounded N. on the Indian ocean, S. on Rosel and Warren, E. on Rosel and Franklin, and W. on Montgomery county. Its extent from N. to S. is 35, and from E. to W. 21 miles. By the census of 1850 it contains 44 males of 21 years and upwards.—Allo, a township in Chenango county, New York, on the E. side of Chenango river, containing 655 inhabitants.

GREENFIELD, a handsome flourishing post-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.—Allo, a post-town in Saratoga county, New York, containing 3073 inhabitants.—Allo, a town in Hillborough county, New Hampshire, containing 934 inhabitants.

GREENHILL, John, in Biography, a painter of much promise, but whose difficulties morals cut short his thread of life, at the early age of 20. He was born at Salisbury in 1619, and became a pupil of Lely, whose manner of course he imitated, and with much success.

GREENHOUSE, in Gardening, a house of shelter in a garden; contrived for preferring 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 handsomely ranged in cages for the purpose.

The greenhouse is a sort of building, framed and covered with glazed frames, designed for the purpose of preferring 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 them to face occasionally, which may prove servicable, not only in severe frosts, but also in moist foggy weather, where a moderate fire will now and then dry up the damp, 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, frames, or stages, during the winter, to be removed to proper situations in the open air, in the hot summer season; while in that there are beds, borders,
ders, and clumps, laid out in the ground plan, and made up with the best 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 10 to 20 feet, or more in length, according to the number of plants to be contained; and in width, from ten or 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 returns 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 sashes may be five or six feet; and the piers between the sashes may be either of timber, six, eight, or ten inches wide, according to their height, or if of brick or stone-work, two feet wide at leaf, sloping both sides of each pier inward, that by taking off the angles, a free admissial 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, shutters may be hung on the inside to fall back again to each pier. The roof may be either wholly or only half glass-work, next the front; the other half fluted, especially if the upright or front piers are of timber; and the shutters to cover the top glasses may be so contrived as to slide under the fluted roof; where the piers are of brick or stone, it is common to have the roof entirely fluted or tiled; but flating is the most ornamental for a half or whole roof; and the ciling 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 or 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 fliding sashes for communication, and the front almost wholly of glass-work, and half or whole glass roofs. Thus, by these additional wings, the houses consist of three divisions, whereby the different qualities and temperatures of the various plants can be more eligibly 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 a stove or hot-house.

On whatever plans green-houses are constructed, the whole of the inside walls should be neatly finished 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 stands, frames, or trifles, which may be moved in and out, upon which rows of plants 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 not 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 first, in such a manner, that the heads of the second row will 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 round them, that the damp occasioned by their perspiration, may be the better dissipated; which by being kept in too closely often occasion a mouldiness upon the tender shoots and leaves, and, when the house is close shut up, this flagrating, rancid 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, shews 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.**

*Agave, agave or American aloes,* comprising common great American agave, with entire green leaves, and a branching flower-flalk;—common agave with striped leaves;—Virginian agave, with narrower pale-green leaves.

*Aloe, African aloes,* containing mitre-shaped aloes-tree, and sword aloes;—aloes ferox;—fan aloes;—feccocine aloes;—soap aloes;—partridge-breed aloes and other aloes;—warted-tongue aloes;—pearl-tongue aloes;—cobweb-aloe;—hedge-hog aloes;—cushion aloes;—spiral aloes;—pentagonal spiral aloes;—triangular spiral aloes;—iris uvaria aloes.

*Anthericum, spider-wort,* containing shrubby flaked, onion-leaved anthericum;—aloë-leaved anthericum;—mock aphodel anthericum.

*Cacalia, foreign clover's-foot*; comprising cacalia bicocoides;—Kleinia or Indian cacalia;—anteaphorium cacalia;—papil lary cacalia.

*Calat, melon-cistron,* containing cacal spicata;—common Indian fig.

*Cestoplun, new loret,* containing round-leaved, long-leaved, hemispherical-leaved navel-wool.

*Croftula, lesser argum,* containing several species.

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*Euphorbia,*
GREEN-HOUSE PLANTS.

Euphorbia, euphorbiun; containing most of the forts.
M. j enforcing, pug margarita; containing many curious species.
Senecio, piec-er, or house-leek; containing tree-house-leek.—variegated tree-house-leek.—leek narrow canary tree-house-leek.

Herbaceous Kind.

Anchusa, Ethiopian corn-flag; containing ringent scarlet anthyloza — Ethiopian crimson anthyloza — canonia, or large fpatched scarlet-flowered.
Antirrhinum, snap-dragon; containing variegated snap-dragon.—Gibraltar spotted flowered linaria.—Dalmatian toad flax.
Arilfolia, birth-root; containing evergreen arilfolia;—pilfolia, or small birth-root.

Bryonia, bryony; containing African tuberous-rooted bryony.
Calat, calla; containing sweet calla, or Ethiopian arum.
Campanula, bell-flower; containing American bell-flower.
Camara, camara; containing canary bell-flower.
Canna, Indian flowering reed; containing common Indian flowering reed, and varieties.—glaucous Indian reed.
Cornum, aphlodel lily; containing African aphpdel lily;—broad-leaved aphlodel lily.
Cyclamen, cyclamen; containing Persian cyclamen, and several varieties.
Erodium, erodium; containing pentandrous geranium or crane's bill;—thick-leaved erodium;—upright dwarf erodium.

Erythrina, corall-tree; containing lherbaceous crythrina.
Ixia, isix; containing African woolly-headed ixia;—bulbiferous isix;—flexuous isix;—corymbous spotted-flowered isix.
Leonurus, lou's-tail; containing African scarlet leonurus;—striped-leaved leonurus.
Ornithogalum, star of Bethlem; containing Cape ornithogalum.

Trachelium, Indian crest; containing double Indian crest, or reddish.

Shrubby Kind.

Andromeda, andromeda; containing tree andromeda, or Carolina forned.

Arabiscum, ambretree; containing Ethiopian smooth amber-tree;—ciliated amber-tree.

Aphylis, Jupiter's beard, or barba jovi;—common barba jovi, or silver buff;—Spanish tuncate-leaved barba jovi;—dwarf Portugal barba jovi;—ericaea, or prickly an-thyllis.

Arctotis, arctotis; containing rough-leaved arctotis;—narrow-leaved arctotis;—sea rag-wort leaved arctotis;—plantain-leaved arctotis.

Artemisia, mug-wort; containing tree wormwood.

Afriphila, fake-wort; containing shrub afriphila.

Alparagurus; containing white prickly alparagurus;—deciduous brily-leaved alparagurus;—acute-leaved alparagurus;—reptilated great prickly alparagurus.

After, flat-wort; containing shrubby African alter.

Arctopus, milk-squirt, &c.; containing the tragacanth, or goat's-horn, and several varieties.

Araya, deadly night-shade; containing shrubby deadly night-shade of Spain.

Baccharis, chugalman's fleshenard; containing ivy-leaved baccarhis;—eleader-leaved baccarhis;—halimus-leaved baccarhis.

Bofcis, y ro-se-ro; or shrubby golden-rode tree.

Brunia, brunia; containing knot-flowered, or imbricateleaved, woolly-heath leaved abrotenoides, or thyme-leaved radiated brunia.

Bubon, Macedonian pasley; containing shrubby gallani-ferous bubon.—shrubby gymniferous bubon.

Buddleia, buddleia; comprising American long-spiked, oc-cidental American, globular-headed buddleia.

Buphthalmum, ex-eye; containing shrubby Jamaica ox-eye;— maritime, or sea ox-eye.

Dypaum, hare's ear; containing shrubby African hare's ear.—shrubby disforme-leaved Cape hare's ear.

Calendula, marigold; containing shrubby Cape marigold;—shrubby graps-leaved Ethiopian marigold.

Capparis, capor-bufh; containing spinous capparis, or true caper shrub.

Cassia, cassia; containing Cape phillyrea;—Maumeean, or Hottentot cherry.

Canaralus, canalus; containing African ecanothis.

Cologrus, flass-tree; containing pyracantha-leaved cela-trus;—box-leaved;—myrtle-leaved cela-trus.

Centaurea, card-tree; comprising common carob-tree, or St. John's beard.

Chamerion, thonerex; containing dwarf palm.

Chrysanthenum, chrysantheum; containing shrubby canary chrysantheum;—shrubby florescent chrysantheum.

Chrysosma, gillylocks; containing shrubby com mar, or greater African gillylocks;—shrubby nodding gillylocks.

Cistus, cistus; containing bay-leaved cistus;—sea purslane-leaved cistus;—and several other species.

Citrus, citrus-tree; containing lemon-tree, and orange, with all the varieties of each.

Chiffonia, chiffonia; containing flex-leaved chiffonia.

Chlytha, alder-noider chlytha; containing purslane-leaved chlytha;—elatera or Indian chlytha.

Colon, colon; containing shrubby Ethiopian scarlet coluca.

Convulvulus, convulvulus; comprising evergreen canary convulvulus;—silver convulvulus.

Cornuila, cornuila; containing valentine cornuila;—glaucous cornuila;—silver cornuila.

Dais, dais; containing catinuss-leaved dais.

Digitalis, fox glove; containing shrubby canary fox-glove.

Diofn, African spicrea; containing opposite-leaved, hairy-leaved, red diofn, &c.

Elenus, elena; containing ebony of Crete.

Genista, broom; containing shrubby canary broom.

Geranium, geranium; containing all the shrubby kinds.

Gordonia, gordonia; containing hollybty.

Gorteria, gorteria; containing shrubby prickly-leaved gorteria.

Grewia, grewia; containing occidentai grewia.

Halleria, belleria; containing African-fly honeyfumble.

Heliotropium, turn-solk; containing shrubby Peruvian heli-tropium.

Hernaria, hermania; containing althea-leaved, alder-leaved, lavender-leaved, gooseberry-leaved hermania.

Hypericum, St. John's wort; containing warted-leaved Mineorca St. John's wort;—Carolina St. John's wort;—Clina monogynous St. John's wort.

Jasminum, jasminus; containing Catalanian jasmine;— Aromatic jasmine;—yellow Indian jasmine.

Lirira, candy-tuft;—evergreen tree candy-tuft;—evergreen flirubby-leaved candy-tuft;—ever-flowering tree candy-tuft.

Juglisa, Malabar nut-tree.

Santana,
GREEN-HOUSE PLANTS.

Lantana, American viburnum; containing African lantana, or flax-leaved jasmine;—flage-leaved lantana.

Laurus, bay-tree; containing Carolina blue-berried bay;— red-berried bay-tree;—Indian bay-tree;—cinnamon-tree;— cattley-tree;—deciduous bay-tree.

Labisia, labisia; containing shrubby, pine-leaved, blue lobelia.

Lythrum, box-thorn; containing African box-thorn;—Barbary box-thorn.

Malva, mallow; containing African shrub-mallow medecago; containing shrubby hoary medicago, or moon trefoil.

Melia, melia; containing the bead-tree.

Mentha, mint; containing tree-mint.

Morus, moria; containing canaliculate-leaved moria;— ruth-leaved moria.

Myrica, gale, sweet-willow, and candle-berry myrtle; containing oak-leaved myrica;—Ethiopian heart-leaved myrica.

Myrtus, myrtle-tree; containing common myrtle, which comprehends many varieties.

 Nerium, oleander, or rose-bay; comprising common oleander, with red flowers, scarlet flowers, white flowers, double flowers, fringed-leaved.

Olea, olive tree; containing European olive tree;—Cape or African olive tree.

Ononis, ruff-barrow; shrubby Spanish ononis.

Oleaster, olearia; containing hard-themed chryanthemum.

Othonna, rauwolf; containing pectinat-leaved othonna;— southernwood-leaved othonna.

Papperina, sparrow-wort; shrubby African papera.

Pelargonium, African geranium; containing many shrubby species.

Phlomis, Jerufalem sage; containing yellow phlomis, and varieties;—purple phlomis.

Physalis, physalis; containing alkekengi, or winter cherry;— fumiferous winter cherry;—flexuous winter cherry.

Pistacia, Pistacia nut, and mytic tree; two or three varieties.

Polygalas, milk-wort; containing shrubby myrtle-leaved polygalas.

Portulaca, purslane; containing shrubby Cape purslane tree.

Potentum, burnet; containing shrubby prickly burnet.

Prosofum, shrubby hedge nettle.

Protea, flower-tree; containing common silvery protea, or changing tree;—coniferous protea.

Punica, pomegranate tree; containing dwarf pomegranate.

Rubus, fumach; containing African hoary fumach, and varieties;—African narrow-leaved fumach, and varieties;— thinning-leaved African fumach.

Rosa, rosam; containing African bladder-net.

Rumex, dock; containing forrell tree.

Rutos, knee-bolls; containing Alexandrian laurel;—tongue-upon-tongue laurel.

Salvia, fage; containing shrubby African golden-flowered fage;—shrubby African blue flowered fage;—Canary fage;— Mexican fage, or shrubby Mexican clay.

Scabiosa, scabiosa; containing shrubby scabious.

Sesote, groundsel; containing shrubby African groundsel.

Sidrakites, iron-wort; containing Canary iron-wort;—Cretan iron-wort.

Solanum, night-shade; containing annonum Plini;—baftard capuchin, or winter cherry;—African jagged-leaved folanum, or pomum amoris;—American twin-fruited folanum;—thorny, downy night-shade.

Tanacetum, tansey; containing shrubby Ethiopian tansey;— under-shrubby lamphere-leaved tansey;—tree tansey.

Thraceonanthus, thraceonanthus; containing shrubby African ficus.

Tetractia, tetragonia; containing shrubby tetragonia.

Anchonanthea, germander; comprising Spanish tree-germander;— broad-leaved tree-germander.

Ulex, ephedra; containing evergreen ephedra-tree.

Ulex, horse or robin; containing African berry-bearing furze.

Zygophyllum, bean caper; containing feathery-leaved bean caper;—purflane-leaved bean caper.

Under-shrubby Kind.

Dracocephalum, dracocephalum; containing Canary dracocephalum, or balm of Gilad.

Gnaphalium, gnaphalium; containing oriental gnaphalium, and varieties;—sweet-scented gnaphalium.

Inula, inula.

Keggelaria, keggelaria; containing African keggelaria.

Lavatera, lavateria; containing Cape lavateria.

Lavandula, lavender; containing cat-leaved Canary lavender.

Lotus, bird's foot trefoil; containing Cretan silvery lotus;—lotus Jacobean;—upright lotus.

Medals, medals; containing climbing African medioles.

Origanum, origy; containing dictany of Crete;—dictany of mount Sipylus;—Cretan marjoram;—origy of Smyrna.

Periploca, Virginian tall; containing African hoary-climbing periploca, and varieties.

Physika, bastard alaternus; containing box-leaved phyllica;— heath-leaved phyllica.

Phylitis, bastard brose's ear;—or simpia nobla.

Polium, or mountain pol; containing marum, or Syrian måftich.

Rhamnus, buckthorn; containing broad-leaved Indian rhamnus;—zyxiphus, or jujube.

Scheg, felago; containing corymb felago.

Sulina, rough bind-weed; containing Chinsa rough bind-weed, or China-root;—laurel-leaved rough bind-weed, and several varieties of each.

Stokes, flake; containing bastard elytrichym.

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 being
being covered with a piece of tile or oyster-shell before the 

mould is put in, to prevent their being hopped up, and the 

cloth 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 se-

fon most proper for raising them, are fully explained under 

the culture 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, ge-

raniums, oleanders, cistus, phlomis, shrubby afer, tree-

wornwood, tree-candy-tuft, yellow Indian and Spanish jas-

mines, Indian bay, & & &c. And this should be done in 

the last week in May, or first in June, according as the seafon 

proves more or less favourable for all the other sorts: but it 

should not be attempted till the seafon 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 exposed 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 

sifted, taking a little of the old out, and adding some fresh mould in its stead, which will prove very benefi-

cial; then give moderate watering, not only to the mould, 

but also over the heads of the plants, to clear them effici-

tively from all dirt and lilt 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; some of the handomest plants 

being occasionally placed to adorn spacious fore-courts, or 

arranged on each side of large walks contiguous to the main 

habitation; and others near ornamental garden-buildings; 

they are also sometimes disposed 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 caufe the greater variety and effect in such situ-

ations.

As soon as they have been thus placed out, their chief cul-

ture is, to supply them plentifully with water during the sum-

mer seafon, 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 time once 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 seafon is, either in a morning before nine 

o'clock, or in the afternoon about four or five; for, if per-

formed 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 diffu-

sion should be duly attended to in dry weather. As the 
mould roots, and fibres of the plants are circumscribed 

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 refashions of water, to preserve that due 

and constant degree of moisture which is requisite for the 
support of healthy vegetation in the different plants.

Even moderate rains should not prevent watering occa-
sionally, especially such plants as have spreading heads, 

which prevent the rains, unless very heavy or constant, 

from falling in sufficient quantities on the earth of the pots, 
to moisten it properly. And in hot weather, if some show-

ings of short fogs are spread on the surface of the orange-
tree tubs and others, it will greatly prefer 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 house; 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 pse-

dious 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 rufly yellow hue, which they do not recover during winter; 

therefore, about the latter end of September, or beginning 
of October at late, 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 house. As the time approaches for mov-
ing in the different sorts, clear them perfectly well from 

decayed leaves, & & &c. all the pots being well cleaned, loofen-

ing 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 arranged, then be arranged regularly, and 

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 disposed in regular order, so as to appear to the 
best advantage, both in respect to their general arrangement 

and variety; and so as each may have an equal portion of 

sun 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 disposed so as to set off each other 

and give a pleasing variety to the whole; 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 sun, and a more free circulation of air 
among them.

When the plants have been thus collected in, their prin-
cipal culture is the supplying them with fresh air at all 

opportunities in mild weather, and giving moderate water-

ings occasionally, picking off decayed leaves, cutting out 
calau decayed shoots, and making occasional moderate fires 
in severe weather, also, sometimes to dispel great damp 

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, ac-

cording to the temperature of the weather. When the plants
GREEN-HOUSE PLANTS.

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 diseased, and the young shoots, in many forests, grow moulidy and rot off, and the leaves of the plants drop; therefore, never omit every mild day, when not very damp or foggy, to open some 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 a 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 house; also, when both warm or cold cutting winds blow towards the front of the green-houses, the whole should be kept shut; or, if thought necessary, some of the upper sashes 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 assistance 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 a 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 inure 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 forts, 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, thyruberry-geraniums, and other woody kinds; 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 thyruberry forts; 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 to March; indeed all the succulents should only have it now and then at thisason, when the earth in the pots becomes very dry and hard.

In executing the businesses of watering in general, care should be particularly taken to do it with great moderation at the time the plants are in the green-houses, as when you once over-wet the earth at this season, it will continue in that rate for a long time, and by chilling the tender fibres of the roots of the plants, often cause 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 fort 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 frosty 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 due time in the afternoon, before the air changes to become sharply cold; but in very severe frosts it must be kept close night and day, and the shutters or other covers of canvas 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 fires for fires to keep out the frost. The shutters, or other shelters, besides the glusses, 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 possibly admit, as most of the plants only want protection from frost, and the common shelter of the house, which, with shutting the failures close every night, will be sufficient for the purpose.

In cases where there are fires for fires, it will be advisable to make moderate ashes at such times as the frost cannot otherwise be 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 now and then in the fires also proves very beneficial in expelling the damp unwholesome vapours, so pernicious to all plants of this nature. Whilst the plants are in the house, 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 fast growers, as some of the thyruberry 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, bodeoned to some moderate depth in the spring, removing the loosened soil, and filling the space with fresh compost. But as the plants in general increase considerabllly 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 forts. They may be shifted with the ball of earth about their roots entire; but others, that are weak and sickly, require shifting into entire fresh earth prepared for the purpose.

The most proper time for shifting all the forts 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 root 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 close 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 aloes, 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 green-houses, 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 loofened to a little depth, also, a little way down round the sides, taking the loofened earth out; and in its stead adding a quantity of fresh mould, giving it directly a little water to settle it close. This should never be omitted when necessary. At any time when the surface of the earth is observed to be dry, whether in the shifted or unshifted plants, it is of much service to flir 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 grays grow and the soil is deep and. A foot of the top soil with the turf should be taken off, and, if a sandy or loamy loam, it will do alone; but if a strong loam, some sand and black peaty, boggy, or mossy soil should be added. Such soils should be laid in a heap six or eight months or more, and frequently turned over. Some plants, as aloes, mengencyanthemums, ixias, and exotic liliaceous 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 coalash 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 mossy 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 pots, 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-leaved kinds of plants that have been mentioned.

Where the heads of any of the shrubby kinds become very irregular or shabby, 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, straggling, 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 bark-bed so greatly revives their growth, that they break forth into many strong new shoots, and form handsome renewed full heads in the summer season.

While in the green-houses, 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 state, 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 into balls of fresh earth, or if not shifted, to loosen the earth in the tops and sides of the pots, drawing out the loofened mould, and supplying the place with fresh. They afterwards soon put 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 thin 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 reasons 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, 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 side, which at Statchook, 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 Dikko, that in the 72d degree it does not rise more above eight feet, and probably lies itself entirely at balt. Hence captain Baffin gave up all hopes of finding a passage into the South seas through Davis’s strait, and consequently concluded, that Greenland joined with America. The Greenlanders report, though much dependance cannot be laid upon their information, that the strait at last 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
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 hundred 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 eait 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 Thorbisher, 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 southernmost point of Cape Farewell, and Staten-hoek, in the 55th degree, on the right side north-eaitward, towards Spitzbergen, to the 80th degree; and on the left side opposite to North America, N. W. and N. till about the 75th degree; the coasts having been so far discovered. Most of the Greenlanders live from Staten-hoek 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 30 or 60 leagues. This is particularly the case with that which is the highest mountain in the country, called “Hiorte-tasks,” 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 storm 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 creeks that enter 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 130 geographical miles. The discovery was accidentally made by Eríe Raude, or the red-headed, who being exiled from Iceland on account of the murder of one of its chiefs, found this country; and, sailing 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 pasture, wood, and fruit. 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 household 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. Torfes, a native of Iceland, in his “Groenlandia Antiqua,” dates the discovery of Greenland in the year 982. But it has been inferred from a bull issued by pope Gregory IV. in 835, and which commits the conversion of the northern nations, and in express words, of the Icelanders and Greenlanders, to the first northern apostle Anfgarus, (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 Tryggveson, an account of the new colony in Greenland; and this king, having just renounced heathenism, converted Leif, and perfided 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 Christianty, and the rest of the colony followed his example. In the year 1122 they chose Arnold, a Norwegian, for their bishop; and he fixed his episcopal residence at Gardar. In the year 1261, they, and the Icelanders, subjected themselves voluntarily under the Norwegian feepries; 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 1466. 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, etc., train, and pelt, chiefly by means of foreign ships; for though the Norwegian fellers in Greenland, upon their first establishment, sailed 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 conduct, 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 Europeans found about Hudson’s bay. These people were denominated “Skraelings,” or “Korralit,” an appellation assumed by the Equiniaux. The Danish Chronicle, a work written in verse, and, indeed, of doubtful authority, though cited by Torfes, informs us, that certain Armenians were first driven hither by a storm, 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 call out of Europe, but from the west part of North America. But their origin is traced to the N. E. regions of Great Tartary, between the Ices (marc glacial) and Mungon. They first came into Tartary, after the great dispersion of the nations, and were driven on further and further by imperious or more potent nations that followed them, till at last they were compelled to withdraw into the remotest corner of Tartary near Kamtaka, and from hence they migrated to America; extending themselves round the 8° 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 15th century. Dreading and wishing 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 Walbingham, 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 so 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 Iceland
GREENLAND.

land and Norwegian settlers who inhabited the western district, in the 14th century; after they had been previously diminished in number, or very much enfeebled by a pestilence, which raged about the year 1479. On this occasion the Norwegians were driven from the west to the east side, so that the western parts of Greenland were wholly occupied by these Skraelings. Some of them blended themselves with their conquerors, and others of them receded farther northwards into the inlets between the mountains. The ancient settlement contained several churches and monasteries, from which it would seem that the colony extended over about 200 miles in the south-eastern extremity. On the west some ruins of churches have been also discovered. In the eastern district, as we have reason to imagine, there are some remains of the ancient colony, though no intercourse can be maintained between the inhabitants of both sides of the country, on account of high mountains, perpetually covered with snow, which separate the two parts of Greenland; and the navigation from one to the other is impeded by the mountains of ice, that are driven southward from Spitzbergen, or East Greenland. From authentic records we can derive little information that is satisfactory, or upon which we can rely. From some of the most credible we learn, that Greenland was divided into two districts, called "Well Bygd," and "East Bygd;" the former contained four parishes, and 100 villages; but the latter was more flourishing, as it is nearer to Iceland, and was sooner settled, and also more frequented by Norwegian navigators. The colony that first settled in the east, of which we have already given an account, is said to have comprehended, in ancient times, 12 extensive parishes, 120 villages, a bishop's see, and two monasteries. The present inhabitants of the western district are separated from those of the east by impassable deferts and mountains, so that they know little of one another; excepting that the eastern Greenlanders are thought by those of the west to be a crude and barbarous nation, that defray and eat all strangers that fall into their hands. For about a century after the cessation of intercourse between the Greenlanders and other nations, they were very much neglected; all the attempts made by the kings of Denmark to explore the eastern district having miscarried. At length, in the year 1776, Frederic II. sent the famous navigator, Magnus Henningsen, who, having encountered much danger from storms and ice, and gained sight of land, was obliged to return, probably on account of some unfounded apprehensions which deterred him from proceeding farther. About two years before this event, viz. in 1776, Queen Elizabeth sent out Martin Frobisher to find a N. W. passage to China; he discovered land, which he named "meta incognita," and particularly the straits which bear his name; and traded with the Indians. On his return he brought with him a black ilone, from which gold was extracted. In the year 1778 he was sent out again with a view of establishing a colony in Greenland, but he returned, after a stormy passage and several disasters, with as much of the mineral earth or ore as one could procure, and the design was never perfected. Frobisher was followed, in the year 1585, by John Davis, who sailed as high as N. lat. 64° 45′, i.e. to Ball's river, where he landed and traded with the natives. Then, and in the two following years, he discovered the coasts of America as high as the 70th degree, and gave the straits his own name. In the year 1605, Christian IV., king of Denmark, sent the Danish admiral Godlie Lindenow, accompanied by John Knight, an English mariner, to reconnoitre the coasts of Greenland: the inhabitants on the west side were found to be much wilder than those on the east side, nor did they at all resemble one another in their language, dress, and manners. Voyages of a similar nature were repeated, but no permanent advantage resulted from them. At length, in the year 1721, 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 1758, 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. These adventurers, having passed Statenhuy, 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, "Haabats-Oy," i.e. Hope island. They were hospitably received by the natives, and Mr. Egede took great pains, by his condescending attention, and by the agility 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 trust which he had undertaken with singular fidelity, diligence, and zeal, and having continued in this hospitable 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 Fallier, 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 since followed by several missionaries, particularly from among the Moravians, whose principal settlements were at Kangek, New Herninuth, and Lichtenfels. 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 Danith 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 the fogs on the sea-coast are infalubrious. The land near the shore exhibits a pleasing 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 frost; 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 giving way against one another occasion flocks 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 resembles that of other mountainous countries, the hills being barren, and the vales and low grounds, especially near the sea, rich and fruitful. It is, for the most part, unfertile clay or sand. But whatever is paid of the fertility of Greenland is applicable only to that part which lies between the 68th and 69th degrees of latitude. The most northern parts are totally deftitute of herbs and plants. This country is said 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 scars as big as apples. In its present state, however, though some oats remain, and the traces of ploughed land are perceptible, Greenland is deftitute both of corn and cattle; but its pasture is good, and if the soil were properly cultivated, it would probably yield grain. It produces excellent turnips and coleworts. The sides 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, blue-berries, bilberries, and bramble-berries.

The animals which are most abundant, are rein-deers, dogs refembling wolves, (see Dog,) arctic foxes, and white or polar bears. Hares of different colours are common, but they are smaller than those 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 linnet, which warbles very melodiously. Whales, sword-fish, porpoises, &c., abound on the coasts; and also halybant, turbo, cod, haddock, &c. The species of insects exceed 90. The more dubious animals, which are said to inhabit these seas, are the mermaids, sea-serpents, and krakens. The polar bears, seals, and manatis, 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 same 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 moufe, which miffed Greenland, but flopped Ice land; and the common bat, which was originally temped driven to the latter from Norway; the wolfrene 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 some appearances of a mine of copper; Mr. Egde once received a lump of ore from one of the natives, and here he faw caleum of a yellow colour. Crantz observes, that the highest mountains of this country are on the west side, and the rocks are full of eoliths, commonly perpendicular, and seldom wider than half a yard, filled with fpar, quartz, tale, and garnets. The rocks are generally rather vertical or somewhat inclined, confifting of granite, with some fand-flone and lapis olaris. Crantz also mentions micaceous fchistus, coarce marble, and fperpine; with afhefts and amiathus, crys
tals, and black fcorl. It is said that flante of argill, a new fubfance, has been recently found in Greenland; and this is perhaps the folt transparent fone of Crantz. The lapis olaris is of singular utility in Greenland, and the north of America, as it is used for lamps and culinary utensils.

The present inhabitants of the western coast of Greenland, and who are the defendants of the ancient Skrallings, whom we have already mentioned, and who exterminated the Iceland colony, very much resemble the American Sanoieds and Laplanders in their persons, complexions, and way of life. They are without doubt a branch of the Equimaux of Labrador, who fled that country, and peopled Greenland. They are short, brawny, and inclined to corpulency; with broad faces, flat noses, thick lips, black hair and eyes, and a yellowish tawny complexion. They are for the most part vigorous and healthy, but very short-lived, few reaching the grand climateric, and many dying in their infancy, and in the prime of their youth. The sharpness of the wind, and the glare of the snow, render them subject to a disorder of the eyes. They are also afflicted with the leprosy; and those who inhabit the northern parts are miserably tormented with dy/nteries, rheums and pulmonary disorders, boils, and epilepsy. The small-pox in 1784 made dreadful havoc among these people, who have no aid from medicine, and who depend merely on their "Angekoxa," or conjurers. The Greenlanders, with regard to their constitutional temperatment and disposition, are cold, phlegmatic, indolent, and dull of apprehension; but quiet, orderly, and good-humoured. They live peaceably together; and have every thing in common, without strife and animosity; and strangers they are civil and hospitable. They never walk 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 lice which devour 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 subsist on pieces of old skin, reeds, sea-weed, and a root called "tagloronoc," dredged with train oil and fat. The dung of rein-deer taken from the intestines, the entrails of partridges, and all sorts of offals, are counted delicacies among these savages; and of the staminings of seal-skins they make delicate pancakes. The Danish provisions were at first tasted by them with disgust and abhorrence; but they are now become fond of bread and butter, though they still retain an aversion to tobacco and spirituous liquors. The Greenlanders in common content themselves with one wife, who is condemned to drudgery, and liable to be divorced at the pleasure of the husband. Portions of superior rank and qualities are, however, indulged with a plurality of wives. Their young women are generally chaste and bashful; nevertheless, at some of their feasts the men retire with the wives of their neighbours for licentious amours. Their superfluous seductions are innumerable; 3 g. when

5 B 2

A woman
a woman is in labour, the gaffips hold a chamber-pot over her head, as a charm to hasten the delivery; and when a child is a year old, the mother licks and flabberst it all over, to render it, as she imagines, more strong and hearty. Their clothes 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 appear hably the relics of the old Norwegians; but these excepted, their language seems to have no affinity in etymology, declension, or conjunction, 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 Equinoxus in Labrador, who feem, as we have already said, to be one people with the Greenlanders. Their great number of polysyllables, and of repeatedly combined words, make their language very intricate. Nevertheless, it abounds so much with words, that the Greenlanders, like the Chinese 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 prefixes 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, E, G, L, R, or Z. They seldom join many consonants 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 expressive, 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 substantive, which always begins the sentence. Substantives, as well as verbs, have singular, dual, and plural numbers, but no genders, and they want no article. The dual and plural are formed according to the different termination of the word, with few exceptions. The declensions are easy; the genitive has the end a, or, if a vowel follows, an e, either by addition or change; and the rest of the cases have a preposition affixed to them. The pronouns are not placed before 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 propositions, which are not set before the nouns, as in other languages, but at the end, and again are varied in declension. The verbs have been divided into five conjugations, according to their terminations. They have three tenses, the present, the perfect, and the future; and they have five moods, the indicative, imperative, permissive, conjunctive, and infinitive. The Greenlanders have no verb depenent nor passive, but the latter are formed from the active by some conjunction. Their numbers 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 conjunctions to the end of a word, as the Latins do their; and they do not want interjections. Their syntax is simple and natural; the capital words stands in the front, and the rest follow in order according to their importance. Their style or mode of speaking is not at all by hyperbole, pompos, or bombast, like that of the orientals, but simple and natural; yet they are fond of similitudes and metaphors. Their poetry has neither rhyme nor measure; but it consists 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 fangs, as other nations have, who profess no written records. All they can fay of their progenitors is, that they were brave seal-catchers, and that they killed the old Norwegians. Yet in their facti-cal 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 equinoxes, but they can guess at the winter solstice, within a few days by the sun-beams upon the rocks; and then they celebrate their new year by a fun-feat. From hence they reckon three full moons to the spring, and then they move from their winter houfes into tents. In the fourth moon, i.e. in April, they know that the small birds make their appearance, and the ravens lay eggs. In the fifth their angmarfet, and the seals with their young ones give joyful to their coals by their revolutionist visit. In the fifth the winder-birds breed. When they lose the moon in the bright summer nights, they carry on their calendar partly by the growth of eider-fows, and size and shape of the seeds, and partly by the fading of the sun on the dial of the rocks and mountains; so that they exactly tell when the seals, llites, and birds will arrive in flocks and shoals here and there, and when it is time to repair to the winter-houses, in which they generally shelter themselves soon after Michaelmas. They divide the day according to the ebb and flood, and the night by the rising and setting of certain stars. They think the globe of the earth lands upon polls, which are so rotten with age, that they object crack; and that they would have funk long ago, if they had not been kept in constant repair by the An-ge-koks, who sometimes bring back a piece of rotten wood as an evidence of their important service. Their almanacr makes the instrument to roll 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 stretching and flapping a dried seal-skin, and the thunder is occasioned by that rattle. The mystery of the Aurora Borcalis is unravelled by the founs of the dead flicking at a dance or a foot-ball. The rains are the overflowings of the celestial reflovers; and if the banks shoul break, the sky would fall down. Such is their meteorology! In medicine and surgery they are no lefs ignorant than in the other sciences.

When a Greenlander is in the conlicts of death, they array him in his best clothes and boots, and bend his legs up to his hips, probably that his grave may be the shorter. After death, they elently bewail him for a short hour, and next prepare for his burial. The corpse, being wrapped and fevered 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 keeps of great broad fones to keep off the birds and foxes. Near the burying spot they deposit the
the kajpl 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 for 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 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 deplored his loss with loud crying and weeping. After this mournful duty, the women continue their lamentations in a tremendous howl. This kind of mourning is continued for a week or a fortnight. The howling is often renewed, and prolonged for some weeks, and in some cafes for a whole year.

As for the religion, or rather the superstition of the ancient Greenlanders, they are reported to be such grofs idolaters as to worship the sun, 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 aimed 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 rapid Greenlanders, it is said, conceive a horror at the thoughts of the entire annihilation of the soul. They place their hell in the subterraneous 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 forcers or diviners, to whom peculiar privileges and honours belong. Although the Greenlanders have neither religion nor government, they are free from many of the groffer 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 on partly among themselves, and partly with factors and dealers. Wherever there is a great affability, or rendezvous of Greenlanders, as at a dancing match, or the fun-feast 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 fouth, and even from the cast side of the land, and proceed from two to four hundred leagues, as far as Dikso, with their kajaks and women's boats and the tackle and implements belonging to them, and barter wood for the horns of the unicorn fish, teeth, bones, whalebones, and whale's fins, and part of those they track on their return home. In these voyages they take with them their whole family and subslan; 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, gimbalds, chelligent, and candles; also, striped linen and cotton, kerseys, woolen fockings and caps, handkerchiefs, sheets or boxes, wooden dishes, pewter plates, copper kettles, looking-glasses, combs, ribbons, and all sorts of toys for children. They are fond of buying muslin, alfo guns, powder, and shot; tobacco, which they use only as fumil, serves instead of small money with them. Indeed, they expect a lithe tobacco for every service they perform.

The assembly for dancing, and the fun-feast above-mentioned, are not religious acts or ceremonies, but mere sports and amusements. The fun-feast is kept at the winter solstice, to rejoice at the return of the fun, and the renewal of good hunting and fishing weather. For this purpose they assemble 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 possess, 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-catchings, 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 expressing 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 deferves mention, that they decide their quarrels by singing and dancing, and they call this a "Singing Combat." A Greenland, who conceives himself injured, composes a satirical poem, and repeats it so often with singing and dancing, till his domesties, 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 fate to the beat of the drum, and his party join with repeating "Anna ajah," which occasions laughter among the attendants.

The defendant then retorts in the same manner, and the laugh changes sides; the plaintiff again renewes the same kind of affront. The whole body of attendants constitute the jury, and confer the laurel on the victor, and afterwards the two contending parties are the best friends.

The Greenlanders are employed through the whole year in fishing or hunting. At fee they pursue whales, morger, seals, fisk for food, and sea-fowl. On shore they hunt the rein-deer in different parts of the country. And they have
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methods peculiar to themselves, and corresponding implements, for accomplishing their objects both by sea and land; which we shall not here describe. The Greenland canoes, or "kaiaq," like that in Nova Zembla and Hudson's bay, is about three fathoms in length, pointed at both ends, and 3 ft. of a yard in breadth. It is constructed of thin rafts fastened together with the fines of animals, and covered with dressed seal-skins, 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 to tight about him that no water can enter. Thus seated, 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 overfed, he can easily cast himsclf 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 sail, 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 ft. in length. They are left to the conduct of the women, 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 houses are constructed of stones, on a steep rock, with layers of earth and sods between them. On these walls they rest the beam, or connected beams, for the length of the house, being from 4 to 12 fathoms; and over these they lay the rafters, with small wood between them; the whole is covered with bilberry-houses, and then with turf, with fine earth on the top. Their houses 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 thick 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 house are several square windows, about two feet in size, made of seal's guts and halibut's maws, and sewed so neat and tight, that the wind and snow are kept out, and the light let in. These huts are well warmed with fires, and lighted by means of lamps filled with train oil, and furnished with muffs instead of a wick, which burns so bright that the house is both lighted and warmed by it. Over the lamp is suspended a saltarel-marble kettle, in which they boil all their meat; and over this again is a wooden rack, on which they lay their wet clothes and boots to dry. On the outside of their dwelling-house they have their little fløre-houses, in which they lay up their little flock of fish, fowl, train oil, and dried herrings; and close by their fløre-houses they lay their boats, 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 dressed that the rain cannot penetrate them. The Crantz's History of Greenland, vol. i.

GREENLAND, Eng., or Spitzbergen, was formerly considered 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. and the southernmost point of the South Cape, and 80° 30' N. lat., the northernmost point of the Seven Islands, and between 95° and 25° E. long. Sir Hugh Willoughby, who first discovered land in this high northern latitude, A. D. 1553, called it Greenland; but afterwards visited, A. D. 1555, by William Barentz and John Cornelius, two Dutchmen, who claimed the honour of the first discovery, and called the country "Spitzbergen," 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 Hollander was denominated "Willoughby land," though no such land ever existed. It is moreover said, that before the voyage of these Dutchmen, an English navigator, whose name was Stephen Burrows, had coasted along a defoite country from 78° to 80° 11' N. lat., which must have been Spitzbergen. This country was also visited at different times by navigators, who were employed in exploring a passage to the East Indies by the north-pole; a project which was fuggelled 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 consequent 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 Spitzbergen, where he met with much ice; and this navigator advanced to the latitude of 80° 23'; but he was prevented from proceeding farther by the ice. In 1609, Jonas Poole was appointed by the Muscovy company on the same service; and he with much difficulty made the south part of Spitzbergen, afterwards falling 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° 50', he was obliged to relinquish his object and to 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 Phipps (now lord Malgrave) undertook a voyage by order of his majesty George III., in the year 1773. He found that the land, which was formerly supposed to extend as far as 82° 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 southward at a considerable distance; but Spitzbergen 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 distances 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 fine, and not worm-eaten; and upon flanding 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 others covered with snow, appearing even above the clouds; the waves 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, had not the mildness of the weather, the smooth water, bright sun-shine, and continuous day-light, given a cheerfulness and novelty to the whole of this striking and romantic scene." The current on this coast was found, 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 meganometer, to be 15,035 feet, but by M. de Luc's calculation from observations with the barometer it was found to be 1588 ft.

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 Colon cliff, 79° 53'; E. long. 9° 59' 30'; a bare rock fo called from the remunmence of its top to a clowen 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 disfigured by snow; and on these accounts it is one of the most remarkable points on the coast. The southwestermost land is an high bluff point, called by the Dutch Vogel Sang. This found, though open to the nothward, 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 lee of ice getting in, as this road communicates with several others formed by different islands, 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 plat in 1614. In this situation Hackluyt's Head-land was found to be in N. lat. 79° 47'; E. long. 11° 1' 50'; the tide rose about four feet, and flowed at half an hour after one, full and change. The harbour of Smæerenberg, distant about 11 miles, N. lat. 79° 44'; E. long. 9° 50' 45', has good anchorage in 13 fathoms, sandy bottom, not far from the shore; and it is well sheltered from all winds. The island close to the place where our navigators try is called Amsterdam island, the westermost point of which is Hackluyt's Head-land; here the Dutch formerly used to boil their whale-oil, and the remains of some conveniences 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 feerwy, 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 resort to this place for the latter sale of the whale-fishery. The bone found in this country was chiefly a kind of marble, which dissolved easily in the marine acid. But our navigators perceived no marks of minerals of any kind, nor the leaf appearance of present, or remains of former volcanos. Neither did they meet with infects or any species of reptiles; nor 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 in 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 "blick of the ice." (See Blinks.) One of the most remarkable phenomena which this country exhibited was the "ice-berg." (See Iceberg.) Of the animals and plants of Spitzbergen, 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 pufn, the alca alle, the fulmar, the coxynus grylle and trolls, the northern diver, the larus rissa, the alcid gull, and larus eburneus, the greater tern, the greater brambling, the fes-fnall, the coal-fish, the prawn, the cancer boreas, or angular species of crab, and cancer nujax, not before described, and also cancer ampulla, and cancer pulex; several species of vermes, and shell-fish. Among the plants are a small species of argoilis, several species of fex-frajas, of bryum, of cochlearia, and of lichen.

GREENLAND, a town of America, in Rockingham county, New Hampshire, near the sea, five miles farther from Portsmouth, incorporated in 1713, and containing 548 inhabitants.

**GREENLAND FISHERY.** See Whale Fishery.

**GREENLAND COMPANY.** A joint stock of 40,000L. was by statute to be raised by subscribers, who were incorporated for fourteen years from the first of October 1693, and the company to use the trade of catching whales, &c. into and from Greenland, and the Greenland seas; they may make bye-laws for government, and of the persons employed in their ships, &c. (Stat. 4 and 5 W. Ill. cap. 17.) This company was farther encouraged by parliament in 1696; 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 alined 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 Amc. cap. 16 and thus the trade was again laid open. Any subjects may import whale-fins, oil, &c. of fish caught in the Greenland seas, without paying any customts, &c. Stat. 10 Geo. I. cap. 16. And ships employed in the Greenland fishery are to be of such burden, provided with boats, so many men, filling-lines, harping-irons, &c. and be licened to proceed; and on their return shall be paid 2or. per ton bounty, for whale-fins, &c. imported. 6 Geo. II. cap. 33. See Whale Fishery.

**GREENLAW,** in Geography, a town of Scotland, which, though the county-town of Berwickshire, is an incouderable place, pleasantly situated in a plain, bathed by the Blackadder or Blackadder. The acclivities of the neighbouring eutions 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 demulcished
Greenock.

The site of superintendent of the Clyde situated on the south bank of the river, about 23 miles below the city of Glasgow. The town of Greenock is pretty well situated for commercial purposes, but in other respects it is neither pleasant nor so circum-

anced 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 mutt 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 calamities and vicissitudes of human affairs, must be occasionally in the market.

The harbour of Greenock is divided into two compart-

ments, and is entirely surrounded by well-built and commodious quays of freestone. The entrance is narrow, and in the centre opposite to the end of the mid quay, which serves as the division of the harbours. The eastern harbour is shallow, and is therefore moily frequented by coaling vesels, herring busses, fishing boats, and other small craft. The well harbour, being considerably deeper, is the general

refort of West Indiamen, American traders, and other vesels of greater burthen. In the well 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 probably from the difficulty of engaging the joint consent of the numerous interests concerned, and other causes, no steps have been hithero taken for carrying this scheme into effect. The principal difficulty of the harbour of Greenock, exclusive of the ships bottoms taking the ground every ebb tide, arises from want of water, there being never more than seventeen or eighteen feet in the harbour, even at spring tides. Hence large vesels 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 great confquence 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 is boisterous. The whole rise 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 presents a very great obstacle to every plan of artificial im-

provement. 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 vesels 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 forming rapidly. Indeed nearly opposite to Glasgow, this bank is entirely 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 fisheries, has raised Greenock to a high rank among the commercial ports of Britain, and has been productive of the acquisition of splendid 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 specula-
tions were not productive of gain to the adventurers, and in some instances with serious los. 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

baillie, nominated by the superior, also pofoffes a juridic-

tion. The sheriff 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 splendid to be seen. In the centre of the town

there is a small quay, immediately fronting the mid-quay, which divides the harbour. In this quay is a very hand-
fome church of modern architecture. The other buildings

are the inns, of which the chief, recently built upon a tou-

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-rooms for the occasional recreation of the inhab-

itants and strangers, of whom, from the maritime situa-

tion, there is, at certain feasons, particularly at the arrivals of the West India fleets, a considerable influx.

The scene of the Clyde around Greenock is picturesque and fabulous. The river is about forty miles broad to the

northward, where the village of Helensburgh is erected upon the property of Sir James Colquhoun of Lums, 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 east, and by Kofeneath, the property, and one of the splendid residences of the duke of Argyle, on the west. Beyond this, to the westward, appear the lowing mountains of Arryglesfite, between which is the vast arm of the sea, Lochlong, which is twenty-four miles in length, and in some places said to be unfathomably deep. About two miles to the east is a small village, called Gourroch, situated on a very fine deep bay, well sheltered by projecting 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 almosf singular that Greenock should have risen to its present commercial imp-

portance, whilst Gourroch, situated within less than two miles, and possessing every superiority of physical advantage, should have remained an insignificant village. However this may have originated, too much capital has now been expended upon Greenock and Port Glasgow, to leave the smallest room to suppose 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 Gourroch are many very fine villas, belonging to the opulent merchants of Greenock. At both Greenock and Gourroch are extensive rope-works, belonging to the same company of proprietors. A little below Gourroch is the Clough light-house, a very high and well-built tower, lighted by reflectors, for the safety of vesels coming up, or going down the channel during the night.
this is the island of Bute, belonging chiefly to the nobleman to whom it gives the title of marquis. Bute is about seven miles long, and generally level and fertile. Mount-Revart-calle, 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- nattie, 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 manufactuary 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 seaf. Large quantities of white cod-fish are also caught off the coasts of Bute, Arran, and Argyshire, with which the markets of the west of Scotland are supplied generally at a rate not exceeding two-pence per pound of 22 lbs. 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 Goatfield, 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 Brodick castle, on the island, where his family sometimes reside, especially during the season for shooting grouse or black game. Arran used to be much noted for a smuggling trade, both in contraband articles brought by thefe men 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 fomes, and it is sometimes visited by landiaries, during the summer, for the pur- pose of searching for them, or of purchasing those occasion- ally picked up by the natives. On the isle are only two small towns or villages, viz. Brodick 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 Greencock. 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 leffer island is a mere rock, where a few persons reside, who take charge of the light-house, and sometimes persons in a flote of infantry are boarded here by their relatives, on account of the purity of the air, and the retirement of the situation. Further down, and near the Ayrshire coast, is the stupendous rock, or crag of Ailsa, from which the proprietor, the earl of Caffins, derives his British title. Ailsa 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.

GREENORE Point, a cape of Ireland, in the county of Wexford, in the Irish sea. N. lat. 52° 30'. W. long. 6° 18' from Greenwich.

GREENSBORO, a post-town of America, in Wet- chester county, New York, 264 miles from Washington. Vol. XVI.
ably treated, but he died of his wounds in less than three days. His last words threw 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 my country, queen, religion, and honour; my soul departing from this body, leaving behind the lifting fame, of having belied 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 seaman 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 well be descried. 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 the estate he disdained 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 Launcelton. In 1628, 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 disdained 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 Lansdown, near Bath, in which the parliament forces were commanded by sir William Waller. In this action sir Bevil, at the head of his Cornhillmen, received a fatal blow with a pole-axe. His body was afterwards found, surrounded by those of his officers; and it was observed, to the honour of the gentlemen of England, that there were more officers and gentry, 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 affability to public, that no accident which happened could make any impression on him; and his example kept others from taking any 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 1,504 inhabitants, of whom 1,439 are slaves. This county is mountainous and hilly; but it is well watered, and the climate is pleasant and healthy. Alto, a poet-town of South Carolina, and chief town of Cheraws district; situated on the W. side of Great Pee Dee river, in Darlington county. It contains about 30 houses, a court-house, gaol, and academy; 55 miles E.N.E. from Camden. Alto, a poet-town and capital of Pitt county, North Carolina; on the S. bank of Tar river, distant 23 miles from Washington, and containing about 30 houses, a court-house, gaol, and a ferry called the Pitt academy. Alto, a poet-town of Mecklenburg county, Kentucky; 766 miles W. by S from Washington. Alto, a poet-town in Jefferson county, Mississippi territory; 1217 miles from Washington. Alto, a poet-town in Green county, in the state of Tennessee, situated on the W. side of the north-easternmost branch of Noluckey river, about six miles N. by E. of Greenville college; 653 miles S.W. of Philadelphia. Alto, a poet settlement in the state of Ohio, on the 3d. 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 battlements at each angle, and is capable of accommodating 2000 men. Biog. Brit.

Greenville, 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 50 miles distant from London. There are traces of a royal residence at Greenville so 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 whose death it was conferred on Humphrey duke of Gloucester, uncle to Henry VI., who, in 1435, 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 inclosed the park, in which he erected a mounted 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 embellished the palace. Henry VII. spent much of his time in Green-which, whereby Robert and Edmund, were born. Henry VIII. made considerable additions to the buildings, and during his reign Greenwhich became one of the principal scenes of that futility 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 chidled with peculiar state. She was particularly partial to this manor, 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.; 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 36,000l., 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 fem-
men; and their majesties having resolved to carry it into execution, Sir Christopher Wren recommended that the unfinished 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 emolument. 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 southern bank of the Thames, and extends 865 feet in length, in the centre of which is a defile 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 Rysbrack, out of a single block of white marble, which weighed eleven tons, and was taken from the French by Admiral 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 lefser square, apparently terminated by the ranger's lodge in the park. The two squares are intersected by a spacious avenue, leading from the town through the hospital. The buildings 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, conjoined 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 sides 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 pensioners may be accommodated. In the council-room are several portraits: in the anti-chamber two large sea-pieces, 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 fix small pieces, descriptive of the lofts of the Luxemburgh galleys, in the year 1727. Queen Anne's building contains several apartments for inferior officers, with twenty-four wards, for four hundred and thirty-seven pensioners. King William's building stands to the south-west of the great square, and comprises the great hall, vestible, 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 six feet in length, fifty-six in width, and fifty-high: the ceiling and sides are covered with portraits and emblematical figures, executed by Sir James Thornhill, for which he was paid at the rate of 8s. per square yard for the ceiling, and 1l. for the sides, amounting to the whole to 668l. 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 chapel, and the other parts of queen Mary's building which adjoin to it, were not finished till 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 inestimable 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 pensioners, nurses, and boys, exclusive of the feets for the directors and other officers. The portal consists of an architrave, frieze, and cornice, of flat marble; the folding-doors are of mahogany, highly enriched by carving. The interior is finished in an elegant style; and is adorned with many appropriate paintings; the most distinguishable of which is the altar-piece, executed by West, and representing the preference of St. Paul, on the island of Melita; a subject peculiarly adapted to this establishment. Without the walls of the hospital stands the Infirmary, erected in 1765, after a design by Stuart: it forms an oblong quadrangle, one hundred and ninety-eight feet long, and one hundred and forty-five feet 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 assistance. It contains forty-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 pensioners, who are the objects of this noble charity, must be feamen disabled by age, or maimed, either in the king's service, or in the merchant service, if the wounds were received in defending or taking any ship, or in fight against 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 seamen are provided for, having the exclusive privilege of being nurses in the hospital. The number of pensioners is upwards of 2,000, who are furnished with clothes, diet, and lodging, with a small allowance of pocket-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 brethren of Trinity-house, the lord mayor, and three senior aldermen of London, with some of the principal officers of the hospital. The annual average expense of each pensioner, according to the report of the commissioners of naval enquiry, was estimated at 27l. 10s. 9d. per man; and of the nurses, 20l. 15s. 6d. each; the total annual expense being 69,200l. 58l. The funds of the establishment are principally derived from a duty of sixpence per month, paid by every mariner, either in the king's or merchant's service; the forfeited charters of the earl of Derwentwater; and various benefactions from different foreigners, from parliament, and from private persons.

The old tower at Greenwich, built by duke Humphrey, tenth. Henry VI. was pulled down in 1675, by order of Charles II., who founded on its site the present Royal Observatory, 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. Flamsteed, the first astronomer royal, began his ob.

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servations in September 1676, and did ample justice to his appointment, though walking in an almost unin trodden path, and not having, till 1689, the advantage of a mural quadrant, and even then not such as is now in use, but one contrived by himself. He died in December 1719, and was succeeded by Dr. Halley, who fixed a transit instrument, and had a new mural quadrant of eight feet radius, constructed by Graham. On the death of Dr. Halley, in 1742, Dr. Bradley was appointed; in his time very valuable additions were made to the instruments at the observatory. Dr. Bradley, dying in 1762, was succeeded by Mr. Blix, whose decease, in 1764, made room for the advancement of Mr. Maskelyne, the present astronomer royal, who has displayed eminent ability in his situation. Since his appointment, the observatory has been furnished with an excellent achromatic telescope, of forty-six inches, focal length, with a treble object glass, &c. by Holland; and the whole astronomical apparatus has been greatly improved by Dollond, Nairne, and Arnold. The observations made by the astronomer royal have been, since 1767, published annually under the inspection of the Royal Society, who have the power of visiting the observatory every year, to see that the instruments are kept in proper order.

The church at Greenwich is dedicated to St. Alphage, archbishop of Canterbury, who is said to have been killed by the Danes on its site; it is one of the fifty new churches erected in the reign of queen Anne; the old church having become so ruinous by lapse of time, that the roof fell in about midnight, November 28, 1710. At the end of the town is the Duke of Norfolk's college, for the maintenance of 20 decayed housekeepers. Here is also an hospital for 20 poor persons, founded by Mr. Lambard, author of the "Perambulation of Kent," and called queen Elizabeth's college. There was a convent of friars at Greenwich, founded about the time of Edward IV. For many years here was a considerable powder magazine, which, after repeated application to parliament by the inhabitants, was removed to Purfleet in Essex, in 1760.

The population of Greenwich, as returned under the late act, was 14,359; the number of houses 2,121; many of these are handsome buildings; the streets are irregular, and the whole town is intersected by the hospital and its precincts. Fairs for three days are held at Eaker and Whittonside; and well furnished markets every Wednesday and Saturday. Laidson's Evisons of London, vol. iv. Beauties of England and Wales, vol. vii.

Greenwich, a township in America, in Hampshire county, Massachusetts, incorporated in 1754, and containing 14,600 inhabitants; 20 miles E. from Northampton.—Also, a township in Gloucester county, New Jersey, on the E. bank of Delaware river, opposite to Fort Mifflin; 6 miles S. E. of Philadelphia.—Also, a township in Suffern county, New Jersey, on the E. side of Delaware river, in a mountainous country, 31 miles S. W. of Newton; it contained, in 1790, 2,653 inhabitants.—Also, a town in Cumberland county, New Jersey, on the N. W. bank of Co- hanzey creek, about 3 miles from its mouth, in Delaware bay, containing about 80 houses and a Friends meeting-house; 66 miles S. by W. from Philadelphia.—Also, a maritime and post-town in Fairfield county, Connecticut, 40 miles E. of New York, and containing 3,147 inhabitants.—Also, a town in Washington county, New York, on the E. bank of Hudson's river. At the mouth of this town much bufiloes is done.

Greenwich, East, a post-town, and the chief township in Kent county, Rhode island, distant 16 miles S. from Providence, and containing 17,755 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 cider, and formerly raised tobacco for exportation.

Greenwood, a township in Cumberland county, Pennsylvania, having 724 inhabitants.—Also, a township in Mifflin county, in the same state, containing 969 inhabitants.

Greenwood, a large forest of flatly pines in Litchfield county, Connecticut, covering part of that county, clothed in a green bearded moss, which gives to the whole a gloomy, wild, and whifical appearance.

Greens, 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.

Greessa, a town in Algeria; 30 miles E. S. E. of Tiflis.

Gregarious Birds, are such as do not live solitarily, but associate in flights or coves, a great many together in company.

Gregarious, in Geology, is applied to such relictia or extraneous fossils, found imbedded in the irtrata, as are congregated a great number of the same species together, which very commonly is the cause, particularly in calcareous rocks.

Greggia, in Botany, so named by the late Dr. Solander, 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. 896. Alt. Hort. Kew. vol. ii. 129. Mart. Mill. Dict. v. iii.) See Myrtus.

Gregoire, or Grebou, in Geography, a small island of Africa, in the river Jacuin, 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 Epoch, is the epocha, or time, whence the Gregorian calendar or computation took place. The year 1580 is the 228th year of the Gregorian epoch.

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 clefts, 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 antiphonary of that pontiff, they obtained the appellation of Gregorian notes.

Gregorian Year. See Year.

Gregorio de Puerto Vicio, in Geography, a district and
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 ABO, a town of New Mexico; 110 miles S. of Santa Fe.

GREGORIANUS, in Ichthyology. See Salmo lavaretus.

GREGORY I. in Biography, pope, surnamed the Great, and also dignified with the title of Saint, was a native of Rome, and born about 544 or 5. He was descended 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 answered the most laudable expectations of his friends; 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 imbibed 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 possessed of immense wealth, and being, probably from some disappointments, disgusted 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 Valentius 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 abbot, and sent nunce 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 question, Whether, after the resurrection, the bodies of the righteous would or would not be palatable. 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 sanction, at the same time he ordered the gates of the city to be barred, in the judgment of the saint, 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 practised 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 barge 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 inantly 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 station, 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 world. 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 sacred garments. Till almost the half 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 wishes 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 disfranchised, 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 Christians. In certain letters, which he wrote to the bishops who were for forcing them to embrace Christianity, he condemned persecution of all kinds in the strongest terms, though he enforced it in the influence of Christians, 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 enforcing reformation 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 interested, 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. With all
In the year 602, at the request of Augustin, the pope sent a fresh colony of monks into Britain, and with such directions to that apostle of the Anglo-Saxons, as he had been accustomed, as they had the means of introducing the grossest corruptions and impieties into the system of Christianity established through his mission. During this same year Serenus, bishop of Marseilles, ordered 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 Serenus's zeal, in not furthering 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 inconfiderate and indifcreet zeal, observing, that "though images were not set up in the churches to be worshipped, yet they serve to infract the ignorant: and it is one thing to adore an image, and another to learn from an image."

During the year 624 a revolution took place at Constantinople; the 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 abdicated prince, with his fix 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 accomplished. 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 providence, 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 fulsome terms. His object in this aspect of his behaviour was that he might, by means of the influence 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 her what blessings they might expect from St. Peter in heaven, provided they obliged 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 Constantinople from flying himself oriental or general patriarch, declaring that this title belonged to none but the bishop of ancient Rome. This was not the only instance in which Gregory condescended to flatter base and infamous characters: he shewed equal or even greater complaisance to Bruneant, queen of France, who is described by Bayle as the most wicked woman upon earth, but as capable of winning over the clergy to her interest, because at the same time that he committed the most enormous crimes, she was excessively liberal to ecclesiastics, and founded temples and convents, not for the love of God, but solely for relics to the holy father. In all the letters which the pope wrote to her, he treated her with the most afflicting 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 624, 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 by her ambassador the compliments and congratulations of her zeal for the Catholic faith, and with presents to the newborn prince, of a cross to wear at his neck, in which was enclosed a piece of the true cross, 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 624. Such were the transactions of Gregory I. who has, 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 superfluous weakneces. 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 imposable avarice to the monuments of classic genius; and he points his leverest censure against the profane learning of a bishop, who taught the art of grammar, studied the Latin poets, and pronounced with the same voice the panegyric of Jupiter and Jove 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 slow 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 psalmody 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 homilies, letters, amounting to upwards of eight hundred and ninety, "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 a number of different places on the continent, as Lyons, Paris, Rouen, Basle, Antwerp, Venice, and Rome. The best edition is that of Paris, in 1505, 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 economy. On the four great festivals, he divided their quarterly allowance to the clergy, to his domestics, to the monastries, to the churches, the places of burial, the alms' houses, and the hospitals of Rome, and the rest of the diocese. On the first day of every month he distributed to the poor, according to the seafarers, their flated portion of corn, &c.; and his treasurers were continually summoned to satisfy in his name the extraordinary demands of indigence and merit. The deficit 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 first the dishes from his own table to some objects deserving of his compassion. The mercy 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 conscience, 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.

Eccelesial writers seem unanimous in allowing that it was the learned and active pope Gregory the Great, who collected the musical fragments of such 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 Cauius, speaks of this transaction in the following words: "This pontiff composed, arranged, and constituted the Antiphonarium and chants used in the morning and evening service." Flury, in his Hist. Ecc. tom. vii. p. 150, gives a circumstantial account of the Scota Cantorum, instituted by St. Gregory. It subsisted 360 years after the death of that pontiff, which happened in 624, as we are informed by John Diaconus, author of his life. The original Antiphonarium of this pope was then multiplying; 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 practice. 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, (lib. i. cap. 6) calls his collection "Antiphonarium Centonem," the ground-work of which was the ancient Greek chant, upon the principles of which it was formed. This is the opinion of the Abbé Leberauf, (Traité Historique et Pratique sur le Chant Ecclésiastique, 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 artificers; 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 posts in the church, and was selected by pope Callistus, 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 propounded to him by the emperor Julianian, and solving his doubts with regard to some questions in
in which, it should seem, he was much interested, though what those difficulties were we are not informed. Upon the death of Constatine, in 715, he was raised to the papal dignity, and almost immediately upon this event, the Lombards made an irruption into the imperial territories, and took by surprize the city of Cumae. Gregory, in his quality of Holy Father, endeavoured to prevail on them to restore it, first by threatening them with 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 abjured all further holitises. 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 dupliquat sum, undertook to recover the place, and succeed in the enterprise. In the year 717, the emperor Theodosius, having resigned the imperial dignity, and retired to a monastery, Leo, the Iaurian, 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 six 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 unity between him and all the Christian princes of the West. In 724, 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, Winifrid, 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-pace. This tax, which, about the middle of the ninth century, was laid on the whole kingdom of England, was originally defined solely to the charitable uses above-mentioned, but it was afterwards converted, by the people, to their own use, and levied under the denomination of a tribute to St. Peter, till Henry delivered the country of the burden. About the year 726, Leo, determined to restore the Christian worship to its primitive state, forbade all kinds of image-worship, and caused the edict to be promulgated through the empire. He gave notice of the same to the pope, requesting his assistance in carrying the resolution 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 the soldiery could not suppress without much mischief and bloodshed. Ithurand, 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 concern, 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 Urban, the doge of Venice, which was readily granted, and which was effectual in deterring the emperor’s dominions from the power of the Lombards. Gregory pursued 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 unalterable, and he took measures to get possession of the person of Gregory, to prevent him from formenring 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 over- reign: 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 Confulantine, 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 effectuated, 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 holitity, and was written in a styile of arrogance and abuse which was unexampled. He went still farther, he assembled a council at Rome, confining all the neighbouring bishops, which inflicted a decree, not only declarative of the lawfulness of worshipping images, but commanding them to be wor shipped, 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, feized on the rich patrimonies of the Roman church in Sicily and Calabria, tore from the Roman see the provinces of Eail Ilyrium, and subjected the whole to the patriarch of Confulantine. 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 fat in the papal chair near seventeen years. From the details of his life already given, it appears that Gregory had a zeal for exalting the power and dignity of his see; he was besides arrogant and superstitious. As an author there are fifteen of his “Letters,” and a “Memoirs,” transmitted to his legates in Bavaria, containing instructions for their guidance in managing the ecclesiastical affairs of that country. These are interspersed 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 prebiter of the Roman church, and was much celebrated for his learning and talents as an eloquent and impressive 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 steps 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 Confulantine, 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 prebiter of the Roman church, on whose zeal and firmness he thought he could depend, but when
Gregory.

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 pugnanimity 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 his legate into banishment, and he procured a decree to be passed, establishing the worship of images, and denounced 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 Lutrand, 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 consular 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 molested. To these terms Charles readily acceded; and as soon as Lutrand 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 about 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 strangest testimonies are repairing and adornning churches and monasteries, and inflicting the sceil of "All Souls" day. When the quarrel took place between the emperor Louis le Debonnaire, and his foes, Lotharius perfumed 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 Otilia, as a protection against the defences of the Saracens. This pope died in 844, having presided over the Roman church about 15 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 Otto. 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 solemnly crowned Otto emperor, who had before been only styled 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 scarcely had the Germans reached the Alps, when Credentius, a man of considerable wealth and power, persuaded them to revolt, renounce their allegiance to the emperor, and choose himself for their head. These events obliged Gregory to fly from Rome, on which occasion Credentius declared the see vacant, and caused a person named Philagathius 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 Otto, urged by the intrigues 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 some of the pope's friends, was deprived of his sight, and otherwise cruelly mutilated. Credentius was also taken, and, with his accomplices, ignominiously executed. Gregory was now referred to his see, 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 ineffectual 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 Collec. Concil. A fifth, concerning the privileges of the abbots of Monf. 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 persons 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 pope, and the state of the church. He assembled a council at Sens, 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, directed himself to 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 lasted 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 see greatly diminished by usurpations, the roads infested by robbers, and other disorders prevailing...
wailing in the government. Gregory acted with such vigour, that a powerful party was raised up against him by those who had been accustomed to live by plunder. Moreri.

Gregory VII. pope, who, by his talents, raised the Roman see 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 Seano, 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 first 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 see, 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 fast 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 the voice of "Hildebrand be 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 degree 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 see, 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 see; of constituting himself supreme judge and determiner of all affairs, both ecclesiastical and civil; the disposer not only of bishoprics and archbishoprics, and other ecclesiastical benefices, but of kingdoms and states, and the revenues of individuals; and, in fact, sole and despotic monarch of the earth in temporal as well as spirituals. Gregory was soon 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 retainer of several princes, whom Henry had dispossessed, or who wished to displace 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, bishops, and people of Germany, empowering them to elect another king, if Henry did not, by a sincere repentance, render himself worthy of being placed 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 deposed 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 Canos, in the diocese of Reggio. While remaining in this 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 finally given, the king was summoned on the condition that he should enter at the outer gate of the fortresses without attendants; and at the next gate he was required to divest himself of the emblems of royalty, and put on a coarse woollen tunic, in which drefs, and barefooted, he was suffered to stand 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 feemed, at first, determined to depose him, and place his infant son on the throne in his stead, but to appease their resentment he broke the convention with the pope, refuted 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 immoderate ambition. After various successes, in which the contending armies were alternately victorious, Henry summoned a council of German bishops to meet at Mentz, where they were joined by many of the Italian bishops and German and Italian princes. In this council, Gregory was accused of overetting the hierarchy, and making himself sole monarch of the church; encouraging sedition and rebellion; perfecuting, excommunicating, and deposing 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 room. Notwithstanding these measures, Gregory was able to recover himself, but he was again embroiled in new difficulties, and the Romans became so 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
GREGORY.

protection of duke Robert at Salerno. In that place he died in 1085, having held the see of Rome little more than 12 years, and leaving Europe involved in complicated calamities to which his ambition gave rise. "He was," as Mosheim has well described him, "a man of uncommon genius, whose ambition, in forming the most arduous projects, was equalled by his dexterity in bringing them into execution; fagacious, crafty, and intrepid, nothing could escape his penetration, defeat his stratagems, or daunt his courage; haughty and arrogant beyond all measure, obdurate, impetuous, and intractable, he looked up to the summit of universal empire with a willful eye, and laboured up the steep ascent with uninterrupted ardour and invincible perseverance, void of all principle, and destitute of every pious and virtuous feeling, he suffered little restraint in his avaricious pursuits from the dictates of religion, or the remonstrances of conscience." He was the first pope who claimed the power of deposing princes and absolving subjects from their oaths of allegiance. He also laid claim to most of the kingdoms and states of Europe, and by the boldness of his pretensions, and his menace of exercising the ecclesiastical authority, terrible to many of the powers of the world, involved many of their being feudatories and vassals of the apostolic see. Three hundred and fifty-nine letters of this pope have reached our time, which are divided into nine books, and are inserted in the 10th volume of the Collect. Conc. He is generally supposed to have been the author of "A Commentary upon the seven penitential Psalms," which some writers have improperly ascribed to Gregory I.: and of a "Commentary upon the Gospel of St. Matthew," which is said to be preserved in MS. in the library at Lambeth. Bower. Moreri. Mosheim.

GREGORY VIII. pope, originally known by the name of Albert de Mora, was a native of Benevento, and created cardinal by pope Adrian IV. in the year 1155. He was employed in very important missions, viz. as legate to Spain, and in the year 1172 into Normandy, where he abdicated Henry II. king of England, from the censures which he had incurred by being suppofed in some degree accessory to the death of Thomas à Becket, but not before that monarch had submitted to a disgraceful penance. Upon the death of Urban III. in the year 1187, cardinal Albert was unanimously chosen his successor, when he took the name of Gregory VIII. A short time before his election, intelligence had arrived at Rome of the advantages gained by Saladin over the Christians in the East, and his capture of the city of Jerusalem. Gregory, as soon as he was consecrated, wrote a letter addressed to the Christians in the West, exhorting them to contribute all in their power to the relief of their distressed brethren, and for the recovery of the holy city. He enjoined a five years' fast, to appease the anger of heaven, by abjuring from meat on Wednesdays and Saturdays as well as Fridays throughout the year. The labours of this pontiff were of very short duration. He died within two months of his elevation. He has been applauded for his learning, eloquence, humane disposition, and exemplary manners. "There are three of his letters extant in the tenth vol. of the Collect. Concil. Moreri. Bower.

GREGORY IX. pope, whose former name was Ugolini, was created cardinal bishop of Ostia, 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 crofs, to set out without delay for the Holy Land. He wrote also to the emperor Frederic II. exhorting him to fulfil the solemn promises which he had made to embark a sufficicnt army for the relief of the Christians in the East, adding the several 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 a breach of his vows. Frederic was obedient to the order, but 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 Palencia, but not having paid for absolution before his departure, he was fully 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 papal emmissaries 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, partook so much of the patriarch's alarm, that they refused to perform any religious function, or 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 caufes of complaint were continually occurring between Frederic and the pope, the former being defirous 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 legsates with letters to all the Christian princes, entreating them to oblige the prelates in their respective kingdoms to repair to it. At first Frederic confenited to the holding of the council, and promifed 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 did assemble 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 fent prisoners to Naples. This disappointment, together with the approach of the emperor, and his victorious army, gave such a fough to the pope, that he was feized 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. Concil : there are also extant some fragments of his "Decretal Letters." Moreri. Bower.

GREGORY X. pope, whose original name was Theobald, was first a canon in the church of Lyons ; then archdeacon of Leige, and, taking the crofs, he accompanied Edward prince of Wales in his expedition into Syria. After the death of Clement IV. in 1294, the Roman see was vacant for nearly three years, owing to the intrigues of the cardinals, asfoiled at Viterbo, who all aspired to the dignity themselves.
themselves, and opposed the election of any other. At length the magnates, tired out with the delay, ordered them to be closely confined in the bishop's palace, where they were subjected to many inconveniences, and they began daily to lessen their allowance of provisions. At length they chose Theobald, who was at that time with the crusaders in the East. Friars were dispatched to announce to him the important news; they found him at Ptolemais, now called Acre, waiting for a favourable opportunity of palling to Jerusalem, but upon receiving the decree of his election, he refused to embark for Italy. Before his departure he preached a sermon to the Christians at Ptolemais from these words, "if I forget thee, O Jerusalem, let my right hand forget her cunning, &c." And in his sermon he gave them very solemn assurances that he would render them every assistance in his power. He never forgot his promises, but both before and after his consecration, the successes of the crusaders was an object the nearest his heart. With this view he signified his intention of convening a general council at Lyons in 1274, and invited Michael Palæologus to meet it, in order to complete a work so necessary for the harmony and security of Christendom. In 1273, while Gregory (a name which he assumed at his consecration) was at Orvieto, Edward, who was now king of England, arrived at the city on his return from the Holy Land, and was received by the pope with every mark of esteem and affection. On the king's compliment of the cruel murder of his cousin Henry, son of the duke of Cornwall by Guido, the pope instantly summoned Guido to appear before him within a limited time. Upon his paying no regard to this summons, he was not only excommunicated, but declared infamous, with all his dependents to the fourth generation, and all were anathematised, as equally guilty, who should receive, favour, or admit him into their houses. Finding himself driven from society like a wild beast, he embraced the opportunity of the pope's travelling from Orvieto to Florence, unexpectedly to make his appearance before him, stripped of his garments to his shirt, with a rope about his neck, begging for mercy, and submitting entirely to the clemency of his holiness. Gregory gave him his life, but delivered him up to the king of Sicily to be kept in close confinement till his death. Omitting the mere political events, which happened during the pontificate, we observe that in 1274 the general council which Gregory had summoned met at Lyons, and was by far the most numerous of any that had ever been held. The principal points which occupied its attention, were the procuring relief for the Christians in the East, the union of the Greek and Latin churches, and the restoration of ecclesiastical discipline. To the first object, Gregory perfused the dignified ecclesiaries to devote a tenth of their income for the space of five years. While the council was deliberating, Gregory deplored the bishop of Liege, on account of his irregularities and profanity. This council introduced the famous constitution which provides that the cardinals shall be that up in the conclave during the vacancy of the pontificate. Gregory died soon after the termination of the council, having held the Roman see four years and four months. Several of his "Letters" are extant in the eleventh volume of the "Colli & Concill." He is mentioned by historians on account of his extraordinary faculty, and there seems sufficient reason to believe that he was influenced by a milder spirit than many of his predecessors. In none of them, however, is it possible to observe any conduct at all correspondant to the benevolent spirit of Christianity: in none of them do we behold any attempt, however distant, to imitate the example of Christ, whose disciples, in a superior degree, they professed themselves. Moreri. Bever. 

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 he afterwards applied himself so closely to study, under the instructions of the learned Baldi and other eminent tutors, as to become one of the ablest civilians, canonists, 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 those princes, pathetically exhorting them to spare the blood of their subjects, and to compose their differences in a Christian and amiable manner; but unfortunately without success. In the same year he created twelve cardinals at once, and upon the election of Sicily to Frederic of Aragon, 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 Vicentini of Milan, invaded the territories of the church, making them the masters of several cities, and encouraging the people to throw off the papal yoke, and restore their liberty. 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 elates forfeited, and the lawful property of those who should feize 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, whose 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 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 refused 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 magnates, 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 Avignon; but before he left Rome, he wrote several letters to England, against Wickliff and his doctrines, commanding the imprisonement 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 Waddinga. 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 apt to be 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. Bower. Moreni.

GREGORY XII. pope, whose original name was Angelo Corario, was a native of Venice, and was prepared 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 1403. 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 1407, accompanied by their respective cardinals, with a view of restoring order in the church. It is probable that neither of them was deficient in this interview, but that both were secretly 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, disgruntled at his conduct, deserted 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 1409, which was attended by a numerous body of ecclesiastics, and ambassadors from the kings of France, England, Sicily, &c. and after fifteen sessions it failed of sentence of deposition against Benedict and Gregory, who were declared guilty of hereafter, 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 resistence, formally sent in his resignation to the council of Constance, laying aside all marks of the pontifical dignity. The council were so well pleased with his submission that they decreed he should retain the dignity of cardinal so 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. Concil." He never was a man of shining 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. Bower. Moreni.

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 removed to Rome, was employed in some important missions, 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 Libo, a Calabrian astronomer, which after his death was presented to the pope by his brother. This method, which is fully explained under the word CALENDAR, and referred to in divers 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 1574, Gregory incurred the suspicion of having encouraged the affixation of Elizabeth queen of England, by Pari, 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 Gratin's decreets, which 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 rejoicings were ordered to be made in the city, on account of the protector which their appointment seemed to open, of triumphs to the Catholic faith in a rich and populous empire. In the midst of these rejoicings Gregory was feasted with a quinley, which carried him off in the 84th year of his age, and the 14th of his pontificate. Several of his "Lettres," "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. Moreni. Bower. Unvier. Hist.

GREGORY XIV. pope, son of a senator, who, after the death of his wife, embraced the ecclesiastical life, was made bishop of Cremona, and appointed cardinal with the same title. Upon the death of Urban VII. in 1450, the conclave was divided by the pretensions of 16 candidates for the papal chair, who were all rejected, and Nicholas Sfondrati, the subject of this article, was elected and acknowledged pope, and upon his consecration took the name of Gregory XIV. He performed many humane acts as soon as he was settled in his fee, and then endeavoured to signalize himself as the zealous defender of the Catholic faith. Among other public measures, he sent bulls into France, in which he declared Henry IV. excommunicated, and threatened the nobles with ecclesiastical censures if they did not desert his cause. In France these bulls were treated with the contempt which they merited; they were besides declared scandalous and fictitious, and ordered to be burnt by the common hangman. The pope would probably have taken measures to avenge the insult thrown upon his decrees, but he died of the stone in the year 1551, when only in his fifty-seventh year, and in the eleventh of his pontificate. As a man, he is said to have lived a devout and abstinence life, and to have practised austerities which would rather have suited a cloister than the seat of sovereign power. He created one of his nephews cardinals, and raised six other preferments to the same dignity; and he also granted the duky of Ferrara to duke Alphonso, who, as he had no son, endeavoured to settle the dignity on some of his relations. Bower. Moreni.
Gregory XV., pope, descended from a noble family at Bologna, and married before his election, Alexander Ludovisi, was born in the year 1551. 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 sent 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 refused on his diocesan to the death of his patron Paul, in 1621, when he went into conclave 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 humane 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., exhoriating 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 fanatical and savage undertakings. He next published a bull, prescribing a new form in the election of a pope, by which the cardinals were allowed to give their suffrages secretly, by way of scrutiny, 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, in law of James I. of Great-Britain; by his aid they were enabled to conquer 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 thare which 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 seize 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-establish 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 reft 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 perfons to be educated for foreign missions. Gregory endeavoured to turn to his own purpose the intended marriage between the prince 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 suspended 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 left, likewise of "Epitome ad Regem Perfarum Schah Abbas, cum notis Hegalfoni," and "The Decision of the Rota." He is highly commended for his pious and great learning, particularly in canon law, and for his charity to the sick and poor. He was, in a certain degree, the encour- rager and patron of learning, and when his nephew, cardinal Ludovisi, had formed a kind of literary academy in his pal- ace, 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 canon- ized their founder, Francis Xavier, and by him the see of Paris was withdrawn from subjection to that of Sens, and erected into an archbishopric. Moreri. Univer.Hist. Bower.

Gregory of Neo-Cæsarea, named Thoamturgus, 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 Chriitianity from Paganism, by the name of Theodorus. 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 founda- tion of learning at home, he let out upon his travels. In Phrenicia he endeavoured to improve his knowledge of law under the celebrated professors of that science who resided there. He had a letter married to a lawyer in high esteem with the governor of Palantine, 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 in- duced to make one of the party. At Erytus 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 philo- sophers, 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 in- troduced them to a knowledge of the sacred scriptures, and explained to them the passages which to their minds might appear obscure and difficult. About the year 239, Greg- ory 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 esteemed by Dupin 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 him a letter, intoning, 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 with that he would employ his great talents in the service of the Christian religion, which might be essentially benefited by his exertions. His celebrity led many to solicit 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 relented a long time, though, at length, he was induced to accept the charge, and was or- dained, according to Dr. Lardner, by Phædinus, bishop of Amasia, about the year 245. He was recommended to give all his exertions to his native city, which was large and populous,
populons, but immersed in superstitiot and idolatry, and contained but very few Christians. By his great zeal, united to much prudence, he made numerous converts to Christianity, and establisbed 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 disgrace to their religion, and insensibly 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 Samoata 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 unadulterated with superflitious practices. The only works of his that are extant, which are unquestionably genuine, are his "Oration in Praeife 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 1629; and Gerard Volfius published an edition of them at Mentz, in 1694, in 4to. Dr. Lardner says there are two things to be lamented, viz., 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 Jerem speaks of his epistles, whereas there is only one remaining. And Baflf mentions an "Exposition of Faith," or a "Dialogue with a Gentile," which is not now in existence. It may be well supposed that this apologetical man was chiefly employed in increasing his church, or in building it up in knowledge and virtue, by oral instructions and works of good works. His church continued steadfast in the faith after his death, and near the end of the fourth century the Neo-Cafarians were all Christians, having been all along to that period blessed with pastors who were men of true worth. As Gregory, therefore, was an honour to the churches in his time, so his church continued to be an ornament to him. Lardner's Credibility, vol. iv. Moreri. Dupin.

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 early proofs of excellent natural abilities, and a serious turn of mind, and having made great proficiency at home, he went, 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 Baflf, celebrated in the church, and likewise with Julian, who was afterwards emperor. With the former he entered into the intimate 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, Cafarins, who had just arrived 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, practicing the austerities of monsrry, and mixing no farther in the business of the world than was necessary for the management of his father's concerns. In the year 359, he visited Baflf, in his retirement among the mountains of Pontus, and subjected himself to the same severe discipline which he professed. He had not long enjoyed the company of Baflf, when he was sent for in haste to aify 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 Apollonari; and Gregory, who wrote a number of poems in all kinds of verse, on divers serious subjects, by which the loss 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 Baflf 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 quit- ted Nazianzum, and retired to Seleucia, 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 affit 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 Catholic themselves durst fearfully 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 multitude to hear him, and he converted the house in which he was into a church; to this he gave the name of Anatolia, or the Resurrection, because the Catholic faith seemed to have its resurrection in this particular spot. His success excited the jealousy of the Ariam party, who infligted the populace to attack him and his hearers with clubs and stones, both in the street and in the
Gregory. 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 avoidance which he experienced served only to increase the number of his followers. His great celebrity attracted diffidence from distant parts, among whom was St. Jerome, who frequently hinted at having had the honour and happiness of studying under such a master. The Catholics were now sufficiently strong in number to define 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 person 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 confute their safety by flight. This attempt to supplant him produced much uneasiness in the brend of Gregory, and made him more 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 so earnest in their entreaties that he would remain, that, at length, he promised not to desert them till the eastern bishops, who were expected soon to assemble at Constantinople, should release him by choosing a more worthy person to occupy his place. About this period Theodosius the Great was created a partner in the imperial throne, and avowed himself the supporter 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 further promotion 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 holiness, 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 such assemblies, in which pride and ambition chiefly predominated, and which were rather calculated to widen than to conciliate differences among Christians. Upon his return to his native country he was strongly importuned to undertake the charge of the fee 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 unintermixed with superstition, 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 Bari in 1550 in Greek; but the best edition of them was published by Morel, in two volumesfolio at Paris 1609. By Dupin he is classed with the most perfect orators of Greece; yet he admits that his style had too many anathemas, similitudes, and other rhetorical embellishments, which sometimes render his oratory effeminate. Eranius says that he was discouraged from attempting the translation of Nazianzen's works, on account of the acumen and fineness of his style, the grandeur and splendour of the matter, and the obscure allusions which are frequently interfered among his writings. Morel. Dupin.

Gregory, enkindled Nyssen, a faint and father of the church in the fourth century, was a younger brother of St. Baal, and born at Cappadocia about the year 332. He was originally intended for the ecclesiastical life, though for some time he practiced as a professed and pious, with great fortune and applause. At the perfusion of Gregory, in the year 371, 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, as 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 Baal. 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 restored to the possession 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 ministrations, death and resurrection, and to endeavour to allay the factions and quarrels which exiled among Christians in that city. Indeed, 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 affronted 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 lists of the prelates who were present at the synod held at Constantinople in the year 394. 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. Moret. Moret.
GREGORY.

GREGORY, GEORGE FLORENT, 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 proved the occasion of his introduction to the nobility, clergy, and other inhabitants of that city, whose good opinion he conciliated by his behaviour among them. So strong was the impression made in his favour, that on the death of Euphranius, bishop of Tours, in 574, 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 France;" " The Lives of the Saints;" " Fragments of a Commentary on the Psalms," and other pieces. The style and language of the history are harsh and inelegant, but it supplies the historian with facts which serve to fill up the chasms 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 1699. Moreri. Du pin.

GREGORY of Rimini, one of the most illustrious 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. Augustine, 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 Vincent;" " A Sermon," &c. Moreri. Bayle.

GREGORY ST. VINCENT, a Flemish geometer, was born at Bruges in the year 1584. 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 selected 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 Sectio- num Coni, decem Libris comprehenfun," 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 Agmoundesham, Bucks, in the year 1657. He received a good education, and was placed in the quality of fellow 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 the deep and extensive learning, and the skill which he shewed in ancient and modern languages, Oriental as well as European. He obtained some considerable preference 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 lived in great privacy, devoting all his time to literary pursuits. He died before he had arrived at his fortieth year: he laid, however, attainted to the favour and correspondence of many of the greatest men of his age. In 1666 he published " Notes and Observations on some Passages of Scripture;" which were afterwards inserted in the " Critici Sacri." In the year 1690 a collection of his learned tracts was published in quarto, under the title of " Gregorii Posthuma:" he left behind him three translations from the Greek into Latin, which were published in 1665, by Edward Byfe, &c. in his own name. They are entitled " Palladius de Gentibus Indiis et Brachmannibus;" " S. Ambrosius de moribus Brachmannorum;" and " Anonymus de Brachmannibus." Biog. 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 1663, a work entitled " Optica Promota, seu aditibus Rationale Reflexorum et Refractorum Myteria, Geometricae ensulae," &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 disappointed in his object, he laid aside his telescope, and went to Italy, where he resided some years. In 1667 he published at Padua " Vera Circulare et Hyperbolae Quadrature," &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, in quibus Quantitatum Curvarum Transmutationem vel Menfurn," 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 viewing 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 constituted 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 sons all professors of mathematics, at the same time, in three of the universities, viz. David at Oxford, his second son James at Edinburgh, and his third son Charles at St. Andrew's. 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 dimetiendi quadratis Figurarum." He soon perceived 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. Flamsteed the astronomer royal, and with their 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 "Catoptrica et Dioptrica 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 inserted 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 "Alphonomica Physicorum et Geometricorum 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 it, and to throw the astronomical part of his Principles 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 12mo, entitled "The Elements of Physical and Geometrical Astronomy," &c. This imputation 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 1716, 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 Commandine's Euclid; and the other "A Treatise of Practical Geometry," published by Mr. MacLaurin.

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 1755, was succeeded by the celebrated Maclaurin. Charles, the other brother, was created professor of mathematics at St. Andrew's, 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 1763. He published a compendium of algebra and arithmetic in Latin, entitled "Arithmetica et Algebra Compendium, in Usum Juventutis Academicae," 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 Lancahill, where he received the elements of a learned education, which he completed at Edinburgh. He took orders in the church in 1728, and was curate at Liverpool till the year 1731, when he removed to London, and obtained the curacy of Cripplegate. In 1737 he became known as the author of a volume of "Essays," which had an extensive sale, and went through several editions; and in 1749 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 interced of Lord Sidmouth, by his majesty, to the living of Weftham, in Essex; he had previously to this obtained marks of distinction from the bishop of London, which, however, were attended with very small portions of emolument. Dr. Gregory did not live long to enjoy the ease and independence which his noble friend intended, by the presentation of the living of Weftham: he died March 12, 1808. Besides, the works already mentioned, he was author of a volume of "Sermons," of the "Economy of Nature," in three volumes; of "Letters on Literature," in two volumes; and was likewise the editor and superintendant of an "Encyclopedia of Arts and Sciences," in two volumes 4to. He was author of a Church History in two volumes, 8vo.; and of the life of Clatterton, for whose fate he felt the most sincere compassion, 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. Andrew's, and afterwards at Edinburgh. Thus Dr. Gregory was the third professor of his family in a lineal descent: and it deserves to be remarked, that, from his great-grandfather, David Gregory, etc., of Kinneity, 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 practiced it at Edinburgh, Leyden, and Paris, in the 20th 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 1765, he left Aberdeen, and went to Edin-
burgh. Soon after this he was appointed professor of the prac-
tice of medicine in the university there, in the room of Dr. Rutherford, who resigned in his favour. The year follow-
ing, 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 20th 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 rate and faculties of man with those of the animal world," made its appearance in 1765. This production combines many jall 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 prosecuting inquiries in philosophy." Although this publication contained so much valuable matter, that, had it appeared in a much worse dress, it could have done him no discredit, yet he was dissatisfied 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 in-
tended as a syllabus to his lectures; but he only lived to complete his account of the diseases usually termed febrile.


**GRE**

**GRE**

**GRE**

**Gre,** in Geography, a bay in the islets of Mag-
gellan, on the S. coast of Patagonia.

**Gre's Islands,** four small islands in the Mergui Arch-
ipelago. N. lat. 10° 30'.

**Gre'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.

**Gre'ou,** a town of Africa, in the country of Whidah; four miles S. of Sali.

**Gre'weiler,** a town of France, in the depart-
ment of Mont Stomerre; seven miles N. of Creutznach.

**Gre'ifenberg,** a town of Lower Carinthia, on the Drave; 25 miles W. of Villaco.

**Greif'fen,** a lake of Switzerland, in the canton of Zu-

rich, 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 vil-

lage of Greifen isagreecably situated on a small promontory, emboied in a wood.

**Greif'fenberg,** a town of Silezia, in the prin-
cipality of Jauer; 32 miles W. of Jauer. N. lat. 50° 59'. E. long. 15° 30'.—Allo, a town of Hinder Pomerania; 28 miles N. of Stargard. N. lat. 52° 53'. E. long. 15° 12'.

**Greif'fenburg,** a town of Germany, in the Ucker Mark of Brandenburg, on the Sermitz; 45 miles N.E. of Berlin. N. lat. 53° 8'. E. long. 14° 3'.

**Greif'fengagen,** a town of Hinder Pomerania; 37 miles N. of Cultrin. N. lat. 53° 20'. E. long. 14° 36'.

**Greif'fstein,** a town of Germany, in the pro-

vince of Solms Braunfels; seven miles N.N.W. of Braun-

fels. N. lat. 50° 37'. E. long. 8° 23'.

**Greifswald,** or Greiswalde, a seaport town of

Anterior Pomerania, on the river Rik, which is navigable to the Baltic. This town has an university founded in 1426. It was formerly one of the Hanseatic towns; 15 miles S.E. of Stralsund. N. lat. 54° 41'. E. long. 13° 22'.

**Greifswalde Ort,** a small island in the Baltic, off

the mouth of the Oder, near the S.E. coast of the island of Uvedom. N. lat. 54° 33'. E. long. 12° 3'.

**Grein,** a town of Austria, on the N. side of the Da-
nube; 62 miles W. of Vienna. N. lat. 48° 16'. E. long. 45°.

**Greitz,** or Greivitz, a town of Saxony, in the

Vogtland, situated on a river which runs into the Elber. In

this town there are some iron manufactories. It contains

about 450 houses; 12 miles S.W. of Zwickau. N. lat. 50° 35'. E. long. 13° 10'.

**Greksaker,** a town of Sweden, in the province of

Vesternland; 48 miles W. of Strockholm.

**GREMSA.** See Graimsay.

**Grenada,** Leewards, in Biography, a Spanish Do-

minusok most, in the sixteenth century, was born in the year

1524. He was probably intended for a civil life, and edu-
cated with that view, but embracing the ecclesiastical pro-
feffion, he acquired a high character for sanctity and virtue, and was chosen to fill the most honourable posts of his order. He was held in much estimation by the kings of Portugal and Castile, and was made confessor to queen Catherine of Portugal, father to the emperor Charles V., who was anxious of appointing him to the archbishopric of Braga, an honour which he reluctantly declined; he uniformly refused all the offers of ecclesiastical preferment, and devoted his days to the austeritys of monastic discipline, and the composition of pious and devotional treatises. He died in the year 1588. His works are theological, consisting of "A Catechism," in four volumes; "A Treatise on Prayer," in two volumes; "Sermons," in the Latin language, in four volumes; and other pious and practical pieces. The greater part of them has been translated into 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 medial breadth; the extremities gradually contracting northward and southward, and particularly towards the S.W. corner. It was discovered and named by Christopher Columbus in the year 1498; who found it inhabited by a numerous and warlike people, called Caribees or Caribbes, among whom the Spaniards do not deem to have ever attempted to force a settlement. These original inhabitants remained happy and peaceful until the year 1650, when the avance and ambition of a resolute individual devoted them to destruction. This person was Du Parquet, the French governor of Martinico, who putting himself at the head of upwards of 250 hardy ruf-

fians, wantonly attacked and determined to dispose of the

offending natives. This atrocious act was perpetrated under the mask of religion, and with a mixture of fanaticism and

knavery, which no honest 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 embarking; and again on their landing, Du Parquet, caufing

a cross to be erected, compelled them to kneel down before it, and join in devout prayer to Almighty God for succors to their wicked enterprise. Checked, however, in the progres of the nefarious business by some scruples of

5 E 2. confiance,
GRENADA.

Next, 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 3 tom handkerchiefs, and a quantity of glass beads, besides two bottles of brandy for the chief himself, and thus, in 1674, Du Terre, was the island first ceded by the French nation by the natives themselves in lawful a purchase. And their future reliance was considered as a guarantee of peace and tranquility. Du Parquet, having established a colony in Grenada, and built a fort for its protection, committed the government of the island to a captain, named Le Compte, who engaged in a cruel and bloody war with the Caribees, and was 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 inhabited 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 of that execution of those measures by which he had gained possession of Grenada, had so far impaired his fortune, that in 1656 he was under the necessity of transferring his command to Count de Cerillac for the sum of 35,000 crowns. This new proprietor appointed a governor, whose tyrannical and rapacious disposition compelled the most respectable of the settlers to quit the country; and those who remained, affording the impression 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 interests in Grenada, &c. to the French West India company; whose charter being abolished in 1674, the island from that time became vested 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 in 1750, if Raynal has been rightly informed, it contained no more than 251 whites and 552 blacks, who were employed in three plantations of sugar, and 52 of indigo. By subsequent intercourse of a frugal nature with the Dutch, the circumstances of the planters were somewhat improved, influence that in 1762, the fortune of war made the English masters of this and the other Caribeean islands, Grenada and the Grenadines are said to have yielded annually, in clayed and muscovado sugar, a quantity equal to about 11,000 hogsheads of muscovado of 15 cwt each, and about 27,000 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 13th of February 1763. The chief stipulations of this treaty were as follows: 1st. That as they would become by their surrender subjects of Great Britain, they should enjoy the 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. Such of the inhabitants of Grenada as chose to quit the island, should have liberty so 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 Meville was appointed governor. The crown, conceiving itself entitled by the terms of the capitulation to the duty of 4½ 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 case 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. The 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 command of D'Elaing, 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 east the soil is a black mould; on the west side it is a rich black mould on a subsoil 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 14,012,175 pounds of muscovado, and 9,273,657 pounds of clayed sugar; 818,700 gallons of rum; 1,827,166 pounds of coffee; 457,119 pounds of cacao; 91,943 pounds of cotton; 27,638 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 660,000l sterling, excluding freight, duties, insurance, and other charges. The sugar was the produce of 105 plantations, wrought by 18,213 negroes, which is rather more than one hoghead of musco
davo 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; 670,350 gallons of rum; 4,300 gallons of molasses; 8,112 cwt. 2 qrs. 4 lbs. of coffee; 2,716 cwt. 3 qrs. 18 lbs. of cacao; 2,632,427 lbs. of cotton; 2,810 lbs. of indigo, and miscellaneous articles; such as hides, dyeing wood, &c. to the amount in value of 64,754l. or 8d. ; and the total value of all, according to the current prices in London, 614,808l. or 3d. This island is divided into six parishes, viz. St. George, St. David, St. Andrew, St. Patrick, St. Mark, and St. John; and its chief dependence, Caricou, forms a seventh parish. Since the restoration of Grenada to Great Britain in 1783, an island law has been obtained for the establish-

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and parish of St. George, three for the other free 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 reformation 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 reserve 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 bee. The other towns in Grenada are, properly speaking, inconvenient villages or hamlets, which are generally situated at the bays or shilling places in the several out-parishes. The parish town of Caricaou is called Hillborough. 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 Grenadines 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 1600; in 1777, they had decreased to 1300, and at a later period they were suppos'd 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 flated at 35,000, of which 5000 were in Caricaou and the smaller islands. In 1785 they amounted to no more than 23,926 in the whole. The free people of colour amounted in 1787 to 1,115. To prevent the too great increase of persons of this class, every manumission, by an act of the island, charged with a fine of 100l. 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 poll vote and enjoy lands to any amount, provided they are native-born subjects or proprietors, and not aliens. The government 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 5,200l. 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 65l. per cent. sterling. 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 sit 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 is free, 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 20l. per annum, filling out of any freehold or life-estate in the town of St. George, gives a vote for a representative of the town. The law-courts in Grenada, besides those of chancery and ordinary, are the court of grand-juries of the peace held twice a year, viz. in March and September; the court of common- pleas, consisting of one chief and four assistant justices, 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 disuse; the court of admiralty for the trial of all prize-causes of capture from enemies in war, and of revenue-feitures in peace or war, having one judge of admiralty and one surrogate; 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. 12° 10'. W. long. 61° 30'. Edwards's Hist. of the West Indies, vol. i.

GRENADA, or Grenada. See GRENADA.

GRENADA. See GRENADO.

GRENADA, a town of France, in the department of the Landes, and chief place of a canton, in the district of Mont-de-Marsan; seven miles E. of St. Sérè. The place contains 1330, and the canton 7763 inhabitants, on a territory of 195 kilometres, 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 2348 kilometres, in 13 communes.

GRENADIER. See GRANADIER.

GRENADIER, in Ornithology. See LONIA ORIX.

GRENADIN. See Fringilla Granadina.

GRENADINES, or GRENADILLES, in Geography. See Landa Islands, a cluster of islands in the West Indies, amounting in number to more than 26, situated between Grenada and St. Vincent, and producing cotton, coffee, indigo, and sugar. Caricaou is the principal. These islands formerly appertained to the government of Grenada; but by an arrangement of the British administration, a line of division passes in an easterly and west direction, between Caricaou and Union island. The former of these, and some smaller islands south of it, 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 UNION.

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 finel china, particularly for that colour which is called oil-red, 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 maces of silver; these they pay and receive in large bargains; and among a nation to full of fraud as the Chinese, it is no wonder that these are often adulterated with some great an alloy of copper. They pass, 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 this occasion they have recourse to certain people, whole feke bullions it is to refine the silver, and temper it from the copper and the lead it contains. This they do in furnaces made for the purpose, and with very convenient veils. While the copper is in fusion, they take a small brush, and dip the end of it into water; then, slaking the handle of the brush, they sprinkle the water by degrees upon

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GRENADEN, in Geography, a town of Switzerland, in the Vaals; 25 miles E. of Sion.

GRENAT, in Ornithology. See Trochilus Auratus.

GRIE, in Geography, mountains of Hindoostan, in the country of Guzerat, near Junagur.

GRENNA, a town of Sweden, in the province of Småland; 10 miles N.N.E. of Jönköping.

GRENOBLE, an ancient, large, and well-built city of France, and capital of the department of Isère, situated in a marily 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 seat 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 clothes, hats, gloves, &c. The number of its inhabitants is 23,500 in 3 cantrons, on a territory of 265 kilometres, in 26 communes. To the north are the ruins of a citadel, on 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 Chartreuse, a famous Carthusian monastery, founded A.D. 1086, confounding of an excellent library, and many apartments, on an eminence environed by rugged precipices of difficult access. N. lat. 45° 11' 59', E. long. 5° 43' 16'.

GRENOUILLES, les, a cluster of rocks in the West Indian ocean, about 36 miles S.E. from point Morant, in the island of Jamaica. N. lat. 17° 32', E. long. 76° 32'.

GRENVILLE, a town of Nova Scotia. See Granville.

GRANVILLE, 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 Gravel river, and thence defending that river until it meets the north and westernmost boundary of the county of Dundas. This county comprehends all the lands near to it in the river St. Lawrence.

GRANVILLE's Canal, a channel of the N. Pacific ocean, which separates Pitt's Archipelago from the coast of New Cornwall.

GRENZHAUSEN, a town of Germany, in the county of Wied; 5 miles N.E. of Koblenz.

GREPPEN, a town of Switzerland, in the canton of Lucerne; 5 miles E. of Lucerne.

GRES, Cape au; a promontory on the E. side of the Mississippi, in the N.W. territory, 3 leagues above the Illinois river, and the tract of country 10 called extends 3 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 1519. 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. Recourse was now had to the subject of this article, who was sent 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 a large per cent, 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 transacted 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 beneficent purposes. In 1564 he had the misfortune to lose his only son, and he fell upon the means 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 off 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 dissuade 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 sufficient number of auditors assembled to call for the exertions of the lecturer. The subjects of the lectures are divinity, law, physick, astronomy, 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 sym pathetic manner in the church of St. Helen's, 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 Oldeney-park. Biog. Brit.

GRESHAM College. See College.

GRESHAM, in Geography, a small island of Denmark, in the Cattegat; 4 miles N.E. of Fléhöe.

GRESI, a town of Turkish Armenia; 28 miles S.E. of Rizeh.

GRESHLEY's Canal, an inland navigation in Staffordshire, near Newcastle-under-line, made in pursuance of an act of 15 Geo. III. 111. To the account given in our article

Canal
Canal we have here only to add, that in 1805 the Nantwich and Newcastle railway 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 brevura 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 Samogitiae; 20 miles N.N.E. of Miedniki.

Gresset, John Baptist Lewis, in Biography, born at Amiens in the year 1709, was educated among the Jesuits, and from this retreat he sent forth some poems, which pleased all the cafe and delicate pleasantries 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 Chartreuse," "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. Greslet was admitted a member of the French academy in the year 1748. He grew weary of a literary life, seemed 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 1777 he revisited the metropolis, and had the honour, as director of the French academy, to compliment Louis 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. Greslet is placed between Chaulieu and Voltaire, for the graces of light poetry ; he is perhaps the first at the theatre for elegance of verification in comedy, and his morals were as pure as his style. Gen. Biog.

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 Waidhoven.

Greta, a river of England, which rises in the N.W. part of Yorkshire, and runs into the Tees, about 4 miles below Bernard's Castle, in Durham.

Gretina Green, a mean village of Scotland, in the shire of Dumfries, 8 miles from Carlisle, and 52 from Edinburgh, at the S.E. extremity of the county, near the W. bank of the Sark, and bottom of Solway firth; 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.

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